AGRICULTURAL-FOOD POLICY REVIEW

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PREFACE

The current period has been repeatedly described as the "end of the beginning" of a fundamentally changed future for agricultural and food economics. It might also be described as a period of purgatory. Will worldwide weather and economic conditions permit abundant food production and return us to familiar pre-1970 conditions? Or will weather and economic conditions lead to widespread food shortages and a drastically different situation? The policy environment for agriculture and food has also changed. There is a new and different agenda, an enlarged participant group (many nontraditional), and an altered process for determining policy. It is within this period of flux that the future direction of national agricultural-food policy is to be determined.

The Agriculture and Consumer Protection Act of 1973, largely the embodiment of current national policy, expires at the end of the 1977 crop year. As successor legislation is developed, policies and programs will be formulated that will guide the provision of food and fiber over the next several years. The heightened uncertainties deriving from economic conditions and the new policy environment portend greater informational needs for policy development. Policymakers and other participants in the policy process will require more economic analyses of increasing complexity to formulate future national policies.

PURPOSE OF THE REVIEW

The rational formulation of national policy requires that the issues be delineated and defined, goals and objectives established, policy options developed, and alternative programs specified and evaluated for the contingent economic settings in which they would be likely to operate. In a democratic society, the ultimate choices, presumably reflecting society's wishes, are the responsibility of the elected representatives of the people. Policy development and determination (reaching the point of decision) involves essentially a debating process among adversaries with differing objectives and motivations. Policy research should facilitate this process by helping to improve the quality of the debate. It should provide a context in which to frame and define the problem, help to narrow the focus, rule out the irrelevancies, and narrow the areas of disagreement.

The Economic Research Service (ERS), as a public agency, considers one of its major functions in serving the public interest to be the provision of objective economic studies for use in the policymaking process. A major purpose of this publication is to provide a convenient compilation of objective economic analyses of current policy issues—a "handbook" or "briefing book" oriented to successor legislation to the 1973 act. The background material and research results presented here for use by participants in the policymaking process will hopefully improve the quality of the debate and lead to an improved policy decision process.

In the preparation of these articles, care has been taken to avoid advocacy and implicit conclusions and viewpoints. Any subjectivity remaining is that of the authors and it does not represent any official endorsement or position, expressed or implied, of the U.S. Department of Agriculture.

TOPICS COVERED

A strong interrelationship exists among the topics treated in this *Review*, emphasizing that individual agricultural and food policy decisions must be made within the framework of the larger economic policy environment. Policies and programs targeted to one sector of the U.S. food and fiber system may directly and indirectly affect other sectors within the system, as well as sectors in the larger U.S. and world economy. Thus, while issues may be treated individually, associated policies and programs must be evaluated as to their potential impact throughout this larger environment.

No attempt is made here to cover all areas of concern within agricultural and food policy, nor is it possible to provide great detail in the treatment of issues selected for these brief articles. Rather, we present analyses of issues anticipated to be important in developing new agricultural and food legislation. Additional issues will likely emerge and shifts occur in the relative importance of issues between the time preparation of this publication began (July 1976) and actual consideration of new legislation.

The Setting and the Options

Though economic aspects are important in the policymaking process, there are other significant considerations. Questions of equity among various groups in society and relative tradeoffs between economic efficiency and equity must be considered. While equity decisions are not made in economic analyses, final decisions as to equity-efficiency tradeoffs are made in the political process by the participants. To provide a better understanding of the context in which such decisions are made, in the first *Review* article, the authors attempt to describe the political setting and the legislative process, and introduce participants instrumental in formulating agricultural and food policy legislation. The authors of the second article follow up with a preview of possible alternative economic settings in which future legislation may operate and must be appraised.

Essentially, three broad courses of action are open to agricultural-food policymakers: 1) to extend the 1973 act in its present form, 2) to allow the 1973 act to expire and revert to basic legislation, or 3) to formulate a new act. For perspective, authors of the third article review the principal provisions of the 1973 act and evaluate resulting economic impacts during its operative period. To explore the second option, we include as the fourth article a previously published paper in which the authors identify the provisions of so-called basic or permanent legislation that would become operative upon expiration of the 1973 act, and they analyze the likely economic consequences. In the remaining articles, the issues, outlined below, are those likely to be considered in development of a new act or in substantial modification of the current act.

Price and Income Policy Tools

The current, changed era has brought the basic tenets of agricultural production and food policy into question. Parity, long the mainstay or guiding objective of price and income policy, is again being scrutinized. Its value as a guide and its political acceptability, especially to an urban-dominated Congress, are both in doubt. New tenets or guides are being sought which more explicitly treat the widespread interests of all participants in the food and fiber system. In what might be termed the "uncertain search for an agricultural policy guide," cost of production has come to the forefront. In the fifth article, the evolution of the parity concept is reviewed and its economic limitations explored. Authors of the sixth article follow up on this issue by exploring the ramifications of using commodity cost of production as a measure or indicator of economic well-being. The seventh article is related to both of the two preceding ones; the current price support system is discussed and the mechanics of the current use of aggregate cost indices in adjusting target prices are presented.

It could be argued that changing conditions or circumstances dictate that a key feature of future policy and programs must be flexibility. One aspect of this flexibility is production adjustment—the ability for shortrun expansion or contraction of production as domestic and international conditions warrant. A principal means of past production contraction (supply control) has been withdrawal of land from production. The author of the eighth article assesses the effectiveness of past land reserve programs in reducing production and cost to the U.S. taxpayer. He further explores the current status of the historically based acreage allotments, and suggests and evaluates a procedure for updating allotments.

Another way to incorporate flexibility in programs is through use of commodity reserves, often advocated for achieving a number of objectives, the most prominent being stabilization of commodity prices. The fundamental issues, status of research knowledge, and practical considerations yet to be resolved are treated in the ninth article.

Volatile weather conditions have added to the risk and uncertainty faced by both food producers and consumers. Important elements in supply variability are weather conditions and producers' ability to cope with adversities. The Federal Crop Insurance programs, pri-

vate sector insurance offerings, disaster payment provisions of the 1973 act, and producers' ability to withstand natural disasters are analyzed in the tenth article. Recent proposals have been advanced for overhauling the current programs through modification or mergers. Two such bills were introduced in the 94th Congress. Neither was acted upon in the session, but the issue is expected to be topical in the debate on new legislation.

Coordinating Commodity Programs

Three commodities with separate programs authorized by legislation other than the 1973 act are peanuts, rice, and extra long staple cotton. The author of the eleventh article evaluates the current programs and analyzes the impacts of extending the same framework as in the 1973 act to cover these commodities.

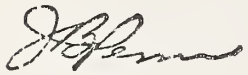
Market Interdependence

During the previous two decades, livestock producers were assured of a stable and economical grain supply as the large commodity reserve provided a price moderating cushion. Conditions since 1970 have become more volatile, requiring significant adaptation by the livestock industry. This development, and the relatively recent structural changes in the livestock sector, have heightened interdependence of the livestock-grain sectors, prompting suggestions for more explicit consideration of livestock economics in formulation of commodity policies and programs. In the twelfth article, the author reviews the conditions leading to the current situation and explores the nature of considerations in formulating joint livestock-grain policy and programs.

Another characteristic of the new economic era is the growing interdependence of the domestic and foreign agricultural economies. The Agricultural Trade and Development Assistance Act of 1954 (P.L. 480) also expires in 1977. The growing export markets for domestic products and the world food situation in general have important implications for the development of U.S. domestic policy. These aspects must now be explicitly considered in the policy formulation process. Trade and development assistance issues and issues surrounding extension of P.L. 480 are treated in the final article.

ACKNOWLEDGEMENTS

One final note—an undertaking of this type requires the concerted efforts of many people, especially if the time lag is to be minimized between preparation and publication. The authors' contributions are, of course, evidenced by inclusion of their signed articles. Also evident in the total product are the considerable tasks of review, editing, scheduling, and management inherent in an effort of this type. Thomas Stucker had the principal responsibility for the Agricultural Policy Analysis Program Area of the Commodity Economics Division (CED), ERS, and Judith Armstrong had principal responsibility for the Information Division, ERS. Publication of this issue of the *Review* is largely due to their diligent efforts. We also acknowledge with thanks the assistance of the Word Processing Center in CED and of the Composition Unit in DI in text preparation. The contributions of numerous other people are also appreciated. Finally, the support of ERS Administrators in making this publication possible and in facilitating its preparation is noted and our sincere thanks extended.



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AGRICULTURAL-FOOD POLICYMAKING: PROCESS AND PARTICIPANTS

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ABSTRACT

Conditions shaping the current environment for agricultural and food policy are sketched. An overall model is presented in which to view the policy process. Participant groups likely to be influential in determining future agricultural and food policy, especially in formulating successor legislation to the Agriculture and Consumer Protection Act of 1973, are discussed.

KEYWORDS: Agricultural and food policy, policy agenda, policy process, agricultural legislation.

> The most obvious facts are the most easily forgotten. Both the existing economic order and too many of the projects advanced for reconstructing it break down through their neglect of the truism that, since even quite common men have souls, no increase in material wealth will compensate them for arrangements which insult their self respect and impair their freedom. A reasonable estimate of economic organization must allow for the fact that, unless industry is to be paralyzed by recurrent revolts on the part of outraged human nature, it must satisfy criteria which are not purely economic. (R. H. Tawney, *Religion and the Rise of Capitalism*, as quoted in Schumacher, E. F., *Small Is Beautiful: Eonomics As If People Mattered.* 1973.)

PREMISE

Public policy decisions in large part involve tradeoffs between equity and economic efficiency. Economists can analyze economic impacts of proposed actions that have equity implications. However, the final choices involving the equity and efficiency tradeoffs remain with the body politic.

Although policymakers want information on the type and magnitude of the tradeoffs, the ultimate decisions often hinge on subjective considerations—"the public good," "the public interest," "the welfare of the people." However, not everyone shares the same conception of what constitutes the public good, is in the public interest, or serves to better the welfare of the people. Understanding policy, then, is partly a process of understanding the motives of those attempting to influence it.

In the past, forces influencing policy were few in

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number and easy to identify. They included the general farm organizations, a bipartisan group of Congressmen from the Midwest and South, and the U.S. Department of Agriculture. Interests were mainly limited to price and income policy.

Major events of the past few years have significantly altered the nature of the concerns and the participants in the agricultural and food policy arena. Farrell contends that "agriculture and its role in world affairs has been transformed radically and irreversibly as a result of economic, social, and political developments here and abroad" (*4*).[1] Domestic and world economic systems are more interdependent, and agriculture must now be viewed as an integral part of national and world economic, social, and political systems. This changed situation creates new and complex public policy issues relating to agriculture and food. Also, the subject now attracts not only the traditional participants but also widely diverse groups, ranging from foreign policy specialists to consumer activists and organized labor.

Evidence of an altered policy environment for U.S. agriculture in this decade is abundant (*8*, *10*, *11*). Many people are intensely interested in the formation of agricultural and food legislation, yet few are more than cursorily familiar with the legislative process by which the broad policies are framed. The purpose of this article is to sketch the overall policy process and to present and discuss the groups who will probably be major participants in the formation of successor legislation to the Agriculture and Consumer Protection Act of 1973.

THE ECONOMIC AND POLITICAL CONTEXT

As recently as a few years ago, many people took for granted an abundant supply of low-cost food in the United States, and agriculture was not a highly visible sector of the U.S. economy. Today, however, that picture has changed, for a number of reasons discussed below. Agriculture has become a major growth industry, one of the Nation's largest. The U.S. food and fiber system accounts for about one-sixth of the gross national product, one-fifth of total employment, and over one-fourth of export earnings. Agriculture represents the foundation for a substantial share of urban and rural employment and a substantial market for industrial and consumer products.

The food and fiber system also represents an important economic asset for the future. Output per hour worked has grown much more rapidly in farming than in manufacturing, for example, a trend likely to continue. Our food production capacity is much larger than required to satisfy domestic demand. Consequently, export markets have become a major outlet for farm production. The United States has vast potential for exchanging replenishable agricultural commodities for those scarce raw materials and resources from other countries that diminish with use.

The structure of the food and fiber system has gradually but significantly changed over the past two decades. Once a distinct, unique way of life, farming has increasingly become integrated into the industrial and service economies. The rising volume and cost of marketing and processing food and other farm products and the increased dependence of all producers on industrial inputs reflect these changes.

The major economic, social, and political events of the past 5 years have impacted seriously on the food and fiber system (*6*). Other events, more specific to the system, have also brought about the fundamentally changed environment. Events leading to the current situation began about the turn of the current decade. Instability has existed in food and fiber input and product markets since that time, as growing demand combined with poor harvests and the extraordinary purchases by the USSR have reduced the level of grain stocks in the world. In prior years, the United States held most of the world's surplus stocks, not through conscious decision but because of an agricultural system that produced more than it could sell. Generally strong U.S. and world export demand, including the Russian purchases, permitted a market-oriented administration to sell Government-secured grain on the open markets, thus depleting the reserves.[2]

Though the changes may be said to have begun in the 1970's, they were brought about by a confluence of forces, some new, but many operating for years previously. From the late sixties into the early seventies, excess productive capacity and burdensome stocks were characteristic. Crop prices were sustained in nominal terms but rising prices in other sectors of the economy resulted in a decline in real prices. The "farm problem" was not as acute as it had been previously but resource returns remained low and the number of farms (and farmers) continued to decline.

[1] Italicized numbers in parentheses refer to items in References at the end of this article.

[2] World reserves were depleted further in 1974 when the harvests were even less than in previous years, especially in the United States. A changed policy stance in the early seventies led to the drawing down of stocks through sales. The Government then completed disposal of its grain storage facilities, which it had begun to do in the sixties. The last Government-owned commodity storage structures were sold in August 1975. The sale marked the end of an era spanning 35 years, in which surplus wheat, corn, cotton, peanuts, and other commodities acquired from farmers under price support operations were stored in Government-owned structures. At the peak in 1959, Government-owned storage capacity totaled 990 million bushels (*13*).

Toward the end of the sixties, agricultural production was brought into better balance with demand, a result partly achieved through land retirement and direct cash payments by Government to producers. Treasury expenditures for these programs reached approximately $4 billion per year. At the same time, the food and fiber system was entering a new stage, the forces responsible being both internal and external to it and to the U.S. economy. Throughout the sixties, substantial internal adjustments had taken place. The rate of increase in farm productivity had begun to level off. A strong economy pulled excess farm labor into the general, off-farm workforce. Schuh suggests that during this period the remaining excess capacity disappeared, reaching near equilibrium in land resources and labor supply, but that general economic conditions obscured recognition of this occurrence (*10*).

By the end of the sixties, then, these factors had become more visible and pronounced in their effects. Other factors, external to the U.S. economy, also registered impacts. Domestic food shortages and increased food prices, although basically resulting from forces long in the making, were triggered by weather's impact on food production across Asia, Africa, and the Soviet Union, and by the USSR's decision to purchase massive amounts of grain rather than reduce livestock production as it had done for previous shortfalls. Food policy made the headlines in U.S. newspapers; stories appeared on the beef price freeze, export embargoes, Government regulation of private trade, meat import quotas, levels of "reasonable" food prices, grain sales and agreements, and the size of the U.S. commitment to foreign food aid. Issues once of specific concern only to the food and fiber system interest groups and farm State Congressmen became broad national issues of concern to many other people.

Also, during the early seventies, issues concerning the energy crisis and the worldwide shortage of raw materials came to the forefront. It became apparent that all countries want use of global resources, that many of these resources are finite, that they can be controlled by a relatively few nations, and that need of or competition for these resources can have distorting impacts on our way of life. The focus during the late sixties on environmental problems had increased public awareness that food production techniques such as pesticide application could affect environmental quality. This environmental focus also reminded the public of the vast extent and uses of resources that food production encompasses. As a result, the general public has come to recognize more clearly that provision of food involves an intricate production, processing, and distribution system relying on resources that cannot be taken for granted. The facts of economic interdependence have also become more plain—that agricultural-food policies and programs can potentially affect many other areas and serve many other objectives than maintenance of food producers' income levels.

The series of denouements predicted for the U.S. balance of payments after the OPEC petroleum price hike have failed to materialize, mainly because of a series of complex international accomodations as well as increased export earnings of U.S. food products. Also, food exports have become a major feature of foreign policy since the period of detente with the USSR and the People's Republic of China (PRC). Further, the visibility of the food scarcity in developing nations and the suggested policies for coping, such as establishing food reserves, increasing food research, and providing development assistance, portend some future molding of domestic policy to conform to international endeavors and to broaden domestic objectives.

This new context complicates the making of agricultural and food policy decisions and has diluted the political influence of traditional sector participants, especially producers. Many new interest groups have been drawn to the policy arena by the realization that their self-interest may be affected by the decisions reached. Many of these new groups are now becoming aware of the complexities involved and beginning to establish knowledge bases and develop individual expertise.[3] Thus, while their impact on policy in the past has depended mainly upon emotional appeal for support, now they are asking hard questions and insisting on straight answers. The changed makeup of the Congress and the relative shift in rural-urban influence within the Congress, combined with the entrance of new groups into the policy arena, promise future debates of increased intensity.

AN OVERVIEW OF THE POLICY PROCESS

Understanding and awareness of the policy process itself would be increased by an extensive study. While we cannot meet this need in this overview article, we present and discuss a common conceptual model of policy formulation in the food and fiber system that may prove useful. The rudiments of such a model have been suggested (*7*), and we elaborate further on it to facilitate an understanding of who the participants are and how the process of agricultural-food policymaking works.

A basic premise in this article is that the goal of U.S. food and fiber policy is to improve the general

[3]One purpose of this *Review* is to provide background and analytical material to a broad spectrum of participants in the policy process, including these new groups.

welfare of society. In a democratic society where the people through elected representatives choose the policies, the basic policy model could be labeled a "democratic model." In such a model, policy is basically a function of persons who actively participate in the policymaking process—a process which almost invariably involves compromise among conflicting interests.

PARTICIPANT GROUPS

Agricultural and food policy in past years and under different names has been primarily a function of producer interests. But in the current more interrelated era, new groups with often conflicting interests must be included. In addition to producers, the participants may be categorized as consumers, public officials and civil servants, agribusiness, and cooperatives.

Producers

Producers usually must group together to have significant impact on agricultural legislation. Traditional farm groups are of two basic types: commodity specific organizations and general farm organizations. Examples of commodity specific groups are the National Association of Wheat Growers and the American Soybean Association; the general farm organizations include the American Farm Bureau Federation (AFBF), Grange, National Farmers Union (NFU), and National Farmers Organization (NFO), among others. Crop interests have generally been stronger than livestock groups, except dairy.

During development of the 1973 act, the NFU and NFO collaborated successfully wth AFL-CIO lobbyists to create a coalition of rural and urban interests. This coalition was necessary to get sufficient Congressional support to pass a "farm bill." The fact that such a coalition was needed and developed has far-reaching implications for future agricultural and food policy legislation.

Consumers

The consumer movement is a relatively new force in the food and fiber system policy arena. Its views are not as well known as those of the more traditional participants, but it is a growing force. Consumer organizations have yet to organize into a unified body. A main characteristic to date has been a close alliance with organized labor for support.

Consumer organizations which are actively taking a role in making policy suggestions for new legislation include, among others, the Consumer Federation of America, the American Freedom from Hunger Foundation, and the National Consumers Congress. These organizations, as with those of producers, have various ideas about what policies and programs would best serve their members and the public interest.

Several common themes surface, however, as general goals of consumer groups. Anoverriding objective in which the issue-oriented goals may be placed is development of a comprehensive national food and agricultural policy. Specific goals for legislative consideration are:

- Increasing stability of food prices and supplies, perhaps through use of a food reserve;
- Providing adequate nutritional supplies to low-income consumers;
- Advocating programs such as zero tolerance regulations, unit pricing, and nutritional labeling;
- Providing humanitarian food aid where needed abroad;
- Assuring equitable incomes to farmers and fair prices to consumers.

Government food assistance programs provide a focal point around which consumers can exert influence. In other areas, without such a clearly delineated focal point, the power of consumer interests may be less concentrated. Eventual establishment of an agency such as the proposed consumer protection agency could increase consumer input into food policy formulation.[4]

Public Officials and Civil Servants

The importance of individual views of public officials and civil servants is often overlooked as an aspect of policy formation. Public officials and civil servants have views of their own that may not necessarily be compatible with or related to the views of their constituency. In other words, they may have their own concepts of what constitutes the public interest. This differentiation holds true whether they are elected officials, political appointees, or career Government employees. Such views can determine the content of a bill through the drafting process, the content of legislative reports, and whether a bill is supported or opposed by key Government officials, passed by the Congress, or signed by the President.

The influence of this group on policy increases when a mandate from the constituency or clientele is unclear or when a statute is written in general rather than specific terms. Once a bill is enacted it must be interpreted. Most legislation contains considerable latitude for interpretation. The administrative rules and implementation procedures are by and large a product of officials and civil servants in the executive branch of the Government and the independent regulatory agencies.

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[4]To further increase knowledge of the impact of this relatively new force, identification and delineation of the goals of interests would be beneficial. Apparent ones likely include an abundant food supply, "reasonable" prices, high nutritional content, minimal health hazards (sanitation, additives, residues, and so on), labeling, grading, and unit pricing.

Agribusiness

While no unambiguous meaning of "agribusiness" exists, the term is generally used to describe those firms whose main business relates to food and fiber provision, but who operate outside the production sector. Input supplying firms, such as feed manufacturers and farm equipment and supply distributors, are included, as are processing firms, such as meatpackers and dairy processors. Distributors of commodities such as fruit and vegetable wholesalers, grocery and related product wholesalers, and retail groceries are also considered agribusiness firms.

Agribusiness emphasizes the marketing component of food policy because "marketing policies" either complement or complicate agribusiness firms' realization of their objectives. For example, market development programs of the Foreign Agriculture Service (FAS) complement the activities of exporters while export controls complicate them. Accordingly, food policy can decidedly affect the strategies firms use in addressing the market. It is not surprising, then, that most of the major agribusiness firms have both trade association and individual firm representation in Washington.

As with other interest groups in food policy, the agribusiness sector has goals of its own. First, there is the desire for an abundant supply of farm products. Volume business allows agribusiness firms to reduce unit costs of operation where profit margins on a unit basis are narrow.

Second, agribusiness favors programs that expand its markets—foreign market development and food aid, school lunch, food stamp, export subsidies, and so forth. It prefers that such programs be oriented toward processed products, where value added is large. Because schools generally prefer more highly processed products, agribusiness tends to favor cash grants under school lunch and food stamp programs rather than direct food aid. Producers, on the other hand, would prefer direct food aid.

Third, minimizing restrictions on their operations is a goal of agribusiness. Generally, firms want maximum latitude for decisionmaking. Government regulations either reduce the firms' flexibility in decisions or impose extra costs, and often do both. Occasionally, agribusiness has favored increased regulation, generally in cases in which a firm wants to restrict competition or protect a market.[5] Price control, licensing, and sanitation regulations are frequently used to accomplish such desired ends.

Agribusiness exerts influence through commodity groups, cross-commodity groups, and also frequently through company representatives in Washington. This multiple strategy is necessary for three primary reasons:

- The cross-commodity approach provides maximum impact on programs that cut across industries (consumer programs, for example);
- Trade associations will not take a position unless nearly unanimous agreement exists among the membership; (because of greater commonality of interests among commodity groups, commodity associations can generally reach a position on a commodity issue more easily than can cross-commodity groups);
- On issues which preclude a trade association position, the firm may want to lobby for its own position; individual lobbying also strengthens the influence of the trade association position.

The impact of any special interest increases if it has direct, personal knowledge of or involvement in the decision process in Government. Thus, it is not unusual to find past executives from agribusiness firms, trade associations, or both, involved in responsible, high-level Government positions. (The same process also occurs for commodity producer groups.)[6] After a tour of duty in Government, such officials often rotate back to the business sector.

Cooperatives

Cooperatives, once largely localized and specific in purpose, are today an important and growing influence in the food policy arena. Because of their size and variety of activities, cooperatives are often associated with the agribusiness sectors. While they are frequently members of predominantly corporate sector trade associations such as the National Canners Association, National Feed Dealers Association, and Milk Industry Foundation, cooperatives also have their own Washington representation.

Agricultural cooperatives are represented in Washington by the National Council of Farmer Cooperatives. The Council primarily emphasizes issues directly reflected in the legal undergirding of the cooperative sector—the Capper-Volstead Act and tax law provisions. The Council general does not become involved in specific policy issues such as commodity price support levels or grain reserves. For milk, the National Milk Producers Federation has emphasized programs unique to the commodity—price supports, marketing orders, and import quotas.

Until recently, major cooperatives have been little interested in pursuing their own legislative programs—either for general farm programs or for cooperative policy issues. A result is that cooperatives have historically had considerably less direct employee involvement in high-level Government positions than

[5]Stigler, Galbraith, and others (*12*) have developed a theory of economic regulation based on such a premise.

[6]Critics refer to this behavior as the "revolving door syndrome": the tendency of regulatory personnel to work in or for regulated industries, either before or after Government service. The propriety of this is a perennial problem faced by nearly all Federal agencies and it is of special concern to consumer advocates and Government personnel managers. Recent reports have highlighted the pervasiveness of this practice (*14*, p. 1).

have the corporate sectors. In many respects, the roles of cooperatives' producer-members have enabled them to have substantial impact in Washington without as much direct involvement.

On general agricultural food and fiber policy, the cooperatives' attitude has three main premises: (1) the general farm organizations are the producer representatives for policy, (2) a professed neutrality, as implied in the basic cooperative principles, and (3) the U.S. Department of Agriculture is an assumed representative of their position in policy matters (except for cooperative policy issues).

A POLICY FORMULATION MODEL

The changed economic environment in which agricultural and food policy must now be formulated would seem to imply that traditional models or conceptual constructs of policy formulation may now be incomplete. They may require augmentation to reflect the influence of the special interest groups (producers, consumers, Government officials, agribusiness, and cooperatives) whose goals and objectives may often severely conflict.

For different policies in different areas or points in the food system, the balance of power may shift significantly among the various interests. For example, producers may have more significant influence on commodity price supports than will other interest groups, agribusiness may have more influence on demand programs, consumer interests will probably be vocal in consideration of export or price controls, and so on. Thus, the weighting process needs to be better understood to fully comprehend the policy formulation process.

Consider, as an example, the current policy issue of establishing a domestic grain reserve. While producers generally appear to be opposed to a reserves policy, agribusiness and consumers seem to favor it, and public officials are divided on the issue. Contrast this divergence of opinion with the attitude toward marketing orders: producers favor them and everyone else appears to be opposed. A simplistic attempt to further illustrate this notion of relative influence appears in table 1. Note that this table reflects a broader set of issues than has typically been associated with agricultural policy. It is designed to reflect the new policy agenda, although the list of issues is by no means complete.

While the discussion thus far has focused on broad agricultural and food policy, it should be noted that policy particular to a commodity or industry continues to be relevant. Many commodities are unique, as are the interests of persons producing, consuming, marketing, and regulating these products. For each commodity or sector, the actors—producers, consumers, agribusiness, and so forth—are different. They have differing convictions and power relationships in policy determination. This uniqueness is reflected in the highly restrictive tobacco and peanut programs as opposed to wheat and feed grains programs which traditionally have involved more economic freedom. While one participant group may hold the determining influence for a while, over time this influence may shift among groups.

Table 1.—A subjective evaluation of the position and relative influence of various interest groups in food policy on contemporary policy issues

Issues	Major interest groups			
	Producers	Consumers	Government	Agribusiness
Supply programs:				
Land retirement	+ + +	-	-	- -
Reserves	- -	+ +	+	+ +
Marketing orders	+ + +	- -	-	- -
Demand programs:				
Market development	+ +	n	+ +	+ + +
School lunch	+ +	+ +	+	+ + +
Food stamp	+	+ +	+	+ + +
Generic advertising	+ +	n	n	+
Price programs:				
Price supports	+ + +	-	-	+ +
Bargaining	†	-	-	- - -
Electronic pricing	n	n	n	- - -
Structural programs:				
Deconcentration	n	+ +	+ +	- - -
Countervailing	+	- -	-	- - -
Consumer programs:				
Specific issues[1]	n	+ + +	n	- - -
Consumer agency	n	+ + +	-	- - -
Input programs:				
Finance	+ +	n	-	-
Research	+ +	n	+	+ +
Conservation	+ +	n	(+ -)	+ +
Water	+	+	n	+ +
Labor	- -	+	+	(+ -)
General economic programs:				
Price controls	- -	+ +	- -	- - -
Energy	-	+	+ + +	-
Environment	- -	+ +	+ +	- -

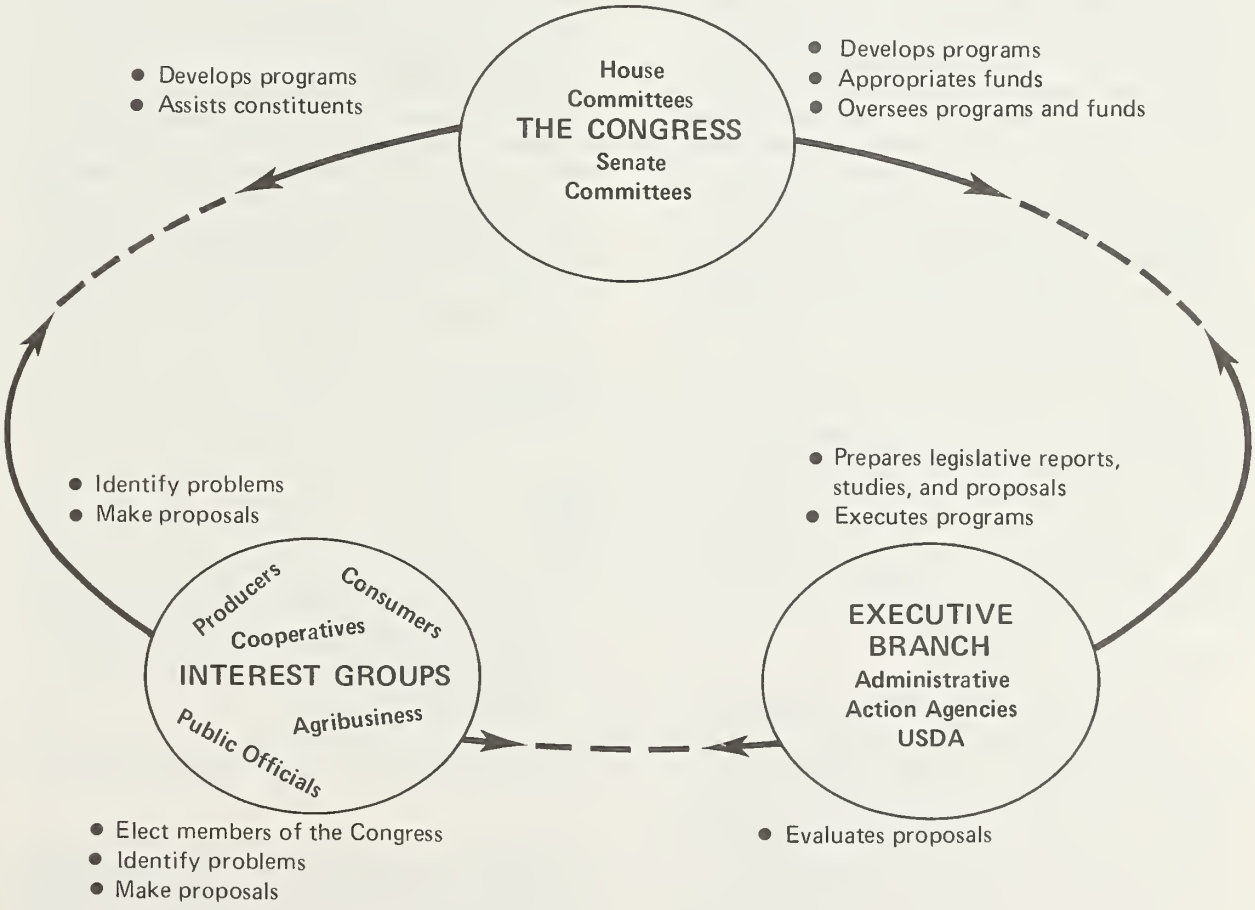
+ favor; - oppose.
n is unknown or not applicable.
[1] Refers to issues such as unit pricing, grade labeling, and false advertising.

For example, in 1976 the rice program changed from an allotment program to the less restrictive market-orientation target price type program. Similar pressures currently exist for changes in the peanut program. Pressures are also being exerted to change marketing orders with pricing or production control provisions, or both. These developments reflect basic changes in the forces affecting policymaking.

The figure illustrates the model of the policymaking process, showing interaction of the legislative, judicial, and executive branches of Government with the interest groups. It depicts the process as circular wherein the main interactions occur among the interest groups, the Congress, and the executive branch including the President and relevant agencies, particularly USDA. Interest groups affect decisions by both the Congress and the executive branch through problem identification, proposals, and the election process. Each of the interest groups—which are themselves not homogeneous lobbies to influence the position of decisionmakers. sionmakers. Through an intuitive weighting process that includes their own values and beliefs as public officials, members of Congress, the Secretary of Agriculture, and the President make decisions. For the Congress, decisions primarily involve programs (laws, appropriations, or oversight). These programs provide general direction to USDA and other agencies involved in food policy administration, and these agencies engage in further interpretation of the programs. The interest groups are, in turn, affected by program decisions, studies, and services or technical assistance they receive. The judicial branch only becomes involved if the main participants in policymaking disagree on policy interpretation or execution. Recently, however, the role of the Judiciary has increased significantly, often to the point of effectively determining policy in cases where legislation is not specific. The environmental and occupational safety and health standards are examples.

Any such presentation obviously oversimplifies the policy formultion process, but it may provide a context for a better understanding of what is occurring. An important component is the weighting process (varying

MODEL OF THE AGRICULTURAL-FOOD POLICYMAKING PROCESS



- - - JUDICIAL ARBITRATION AS NEEDED.

influence) of the different groups on different issues. The general institutional steps in the policy process, discussed in the next section, such as getting an issue on the policy agenda, introduction of a bill, committee hearings, passage by the Congress, and so on, are generally known. However, the less visible, more subtle use of influence in shaping policy at all levels of the process is less well recognized or understood.

THE LEGISLATIVE PROCESS

All of the interest groups mentioned are involved to varying degrees in the legislative process. The focal point of the legislative process is, of course, the Congress and the executive branch. As new legislation is considered by the 95th Congress, the changes that occurred with the 94th Congress must also be considered. The chairmen of several committees were replaced, and attacks upon the seniority system itself may have altered the operational procedures of several others. Further changes may be expected as the 95th Congress is convened.

THE CONGRESS

The Congress receives input from the interest groups, USDA, and other Federal agencies through testimony at hearings, prepared papers, and so on. This information is transmitted to the relevant committees (for agriculture, the House and Senate Agriculture Committees) for initial distillation and review and refinement of proposals. These committees interact with the external groups and agencies, and develop specific proposals for delivery to their full congressional bodies.

Congressional committees are very important in that "...the power to frame the question is often the power to determine the answer" (*1*). They are often the point of origin for bills; bills that frequently are ratified basically unchanged by the larger body as a whole. This is true especially in the House.

Members of Congress attempt to be assigned to committees which most directly affect their constituencies and correspond most closely with their fields of knowledge. The membership of the House and Senate Agriculture Committees at the close of the 94th Congress corresponded roughly to the makeup of the larger legislative bodies; that is, approximately two-thirds Democratic, and one-third Republican.

Senate Agriculture Committee

The 14-member Senate Committee on Agriculture and Forestry consisted of 9 Democrats and 5 Republicans in the 94th Congress. Only one Senator (Hubert Humphrey-Dem., Minn.) on the committee was up for re-election in 1976, so the probability of major changes in committee membership for the next Congress is small. Except for one member from the Northeast and two from the West, the membership was divided about evenly between the South (including the Chairman, Herman E. Talmadge-Dem., Ga.), and the Midwest.

The constituencies of both Democratic and Republican members of the Senate Agriculture Committee are estimated as being approximately 37 percent urban. The percentage varies rather widely, and only 4 of the 14 Senators are from States with urban constituencies of 50 percent or more.

House Agriculture Committee

The House Committee on Agriculture at the close of the 94th Congress consisted of 27 Democrats (2 vacancies) and 14 Republicans. Because of the 2-year term of Representatives, the makeup of the House Committee changes frequently. Approximately one-third of the Democratic members were from the South; the Republican members represented a wide geographic area with 6 of the 14 from the Midwest, and most others, from Eastern States.

While the loss of influence by the rural interests is generally acknowledged, it is difficult to document. Approximately 43 percent of the House Republicans' constituents and 39 percent of the Democrats' constituents live in urban areas (table 2) (*1*).[7] The House and Senate Agriculture Committees remain rural oriented, but the degree of the loss of rural influence, such as

Table 2.—Makeup of House districts, by residence of population, 1966-73[1]

Residence of population	1966	1968	1973	Change, 1966-73
	Number			
Urban	106	110	102	-4
Suburban	92	104	131	+39
Rural	181	155	130	-51
Mixed	56	66	72	+16

[1] The categories are based upon the following criteria:
Urban: Central city—50 percent or more of the population in standard metropolitan statistical area (SMSA).
Suburban: Outside central city but within SMSA.
Rural: Outside SMSA.
Mixed: Less than 50 percent of population in any of the above three categories.

Source: *Congressional Quarterly Weekly Report.* Apr. 6, 1974, p. 878.

[7] The declining rural influence is a key factor in development of new legislation. Passage of agricultural and food-related legislation in the House requires an ever-increasing number of nonrural votes, as evidenced by the decreasing number of districts with predominantly rural population.

through committee compromises made in anticipation of otherwise negative floor action, is extremely difficult to ascertain.

Several House Committee members newly elected in 1974 represent primarily urban constituencies. This increased urban representation has probably affected specific provisions of legislation through hearings and the process of compromise more than whether a bill was voted out of committee. One interesting question is whether urban Congressional interest in the agriculture committees will continue if food price increases moderate over an extended period.

Real Congressional strength in policymaking depends upon successful unification behind proposals. "The farm bloc is no longer numerically strong in Congress and farm legislation can only be passed if there is a consensus between the farmer and other blocs in Congress, such as consumer and urban representatives" (*2*). Attempts to develop cohesive alliances among farm organizations continue in the farm coalition. Its efforts have, however, suffered from a general lack of support from the major farm organizations.

The Budget Process

The passage of the Congressional Budget and Impoundment Act of 1974 (P.L. 93-344—referred to as the Budget Act) was an attempt to give some order to the Federal budgetary process. This law will undoubtedly affect agricultural and food policy and agricultural research programs, but it is largely an unknown factor currently.

To implement the intentions of the Budget Act, a Committee of the Budget was established in both the Senate and the House and a new agency, the Congressional Budget Office (CBO), was formed. Further, an explicit schedule for the budget process was established (table 3), which influences the timing of consideration of specific legislation. According to this timetable, for example, replacement legislation for the 1973 act must be reported by both Chambers by May 15 and enacted by the 7th day after Labor Day.

The current services budget for FY 1978, due November 10, requires the President to inform the Congress of the magnitude of next year's budget, assuming current year programs are continued with no changes. By March 15, 1977, the Congressional committees state their program desires and expected costs. By April 1, CBO informs the respective budget committees of the aggregate target levels to guide the 16 functional committees in not only arriving at their individual budget requests, but also indicating the aggregate ramifications of their individual budgets. By September 25, the budget will have gone through two revisions and one reconciliation period. A major indicator of Congressional concern with the budget is that the Congress cannot adjourn until the completion of the second resolution and the subsequent reconciliation.

The Congressional appropriations committees are also influential in determining the type of agricultural legislation that is adopted. The Senate Committee on Appropriations and its subcommittee for agriculture and related agencies may reduce or increase funding levels for proposed bills, which effectively alters the resultant programs. The counterparts in the House are the Committee on Appropriations and subcommittee for agriculture and related agencies.

In the discussion of appropriations, it should be noted that domestic nutrition and foreign food aid programs account for a large portion of agricultural appropriations. Only about one-fourth of the amount in the appropriations bill passed by the House on June 16,

Table 3.—Congressional budget process timetable

Date	Action
November 10	President submits current services budget.
15th day after the Congress meets	President submits his budget.
March 15	Committees and joint committees submit reports to budget committees.
April 1	Congressional Budget Office submits report to budget committees.
April 15	Budget committees report first concurrent resolution on the budget to their respective Houses.
May 15	Committees report bills and resolutions authorizing new budget authority. Congress completes action on first concurrent resolution on the budget.
7th day after Labor Day	Congress completes action on bills and resolutions providing new budget authority and new spending authority.
September 15	Congress completes action on second required concurrent resolution on the budget.
September 25	Congress completes action on reconciliation bill or resolution, or both, implementing second required concurrent resolution.
October 1	Fiscal year begins.

1976, was for the traditional agricultural programs. Having these food programs in the U.S. Department of Agriculture could be a significant factor in the development of new legislation. Some people contend that food aid programs are necessary to get urban members of Congress to vote for other agricultural programs that are mainly of interest to farmers and agribusiness.

Other Committees

Other committees besides those for agriculture, appropriations, and budget have tended to be increasingly important in forming food policy. The Senate Select Committee on Nutrition and Human Needs has influenced the development of food aid policy. The House Committee on the Judiciary is becoming increasingly important with regard to structural issues, such as cooperatives policy. The Senate and House Interior and Insular Affairs Committees affect agriculture by having jurisdiction over matters relating to federally owned land for grazing. The Senate Foreign Relations and Finance Committees, as well as the House Foreign Affairs, International Relations, and Ways and Means Committees, influence trade and food diplomacy issues. The Senate Small Business Committee is becoming increasingly involved in farm credit. Other committees with jurisdiction over environmental, labor, research, energy, and general economic policy have had and will continue to have substantial impact on the broader aspects of food policy

THE EXECUTIVE BRANCH

Members of the executive branch important in the development of agricultural and food legislation include the President and his advisors; the Secretary of Agriculture, and senior Department officials; and senior officials and staff in various other Federal agencies.

The proliferation of food policy interests in Government is not limited to the Congress. Recent estimates indicate that at least 26 different Federal agencies are involved in the process of policy formulation directly related to food and agriculture. Such widespread involvement in food policymaking has created difficulties both in developing consistent policies and in identifying who is responsible for them. As a recent example, export controls were placed on shipments of grain to Poland apparently without the involvement of the Secretary of Agriculture in the decision.

On March 5, 1976, the Administration, in recognition of the numerous levels of Government involved, formed the Agricultural Policy Committee consisting of:

Secretary of Agriculture, Chairman

Secretary of State

Secretary of the Treasury

Secretary of Commerce

Special Representative for Trade Negotiations

Chairman of the Council of Economic Advisers

Director of the Office of Management and Budget

Assistant to the President for Domestic Affairs

Assistant to the President for Economic Affairs

Assistant to the President for National Security Affairs

Special Assistant to the President for Consumer Affairs

Acting Executive Director of the Council on International Economic Policy

The formation of this Committee was announced with a stated purpose to "...consolidate all agricultural policymaking functions of the existing Executive branch committees. It will have the central and vital role in the development and the direction of our Nation's food policies" (*14*, p. 1). Creation of this Committee, reporting directly to the President, was significant because it reflected the growing recognition that agricultural and food policies are important to a variety of domestic and international interests.

A wide range of suggestions have been made for greater consolidation of agricultural and food policymaking. They include proposals such as these:

- Consolidation within USDA of the many functions currently performed by the 26 Federal agencies;
- Creation of a food council in the Executive Office of the President with functions in food policy similar to those of the Council of Economic Advisers in economic policy;
- Use of the current Agricultural Policy Committee;
- Creation of a new department of economics that would absorb all economic policymaking functions including food policy;
- Conversion of the position of the Secretary of Agriculture into a "super-cabinet" position over all food policy decisions.

Should future changes occur in the structure of the food policymaking process among Government agencies, the method chosen will have great impact on that process.

Members of the executive branch influence policy formulation through testimony in hearings as well as through the political powers of the President. Legislative proposals from the executive branch are sent to the Congress through an "Executive Communication":

> This is usually in the form of a letter from a member of the President's Cabinet or the head of an independent agency—or even from the President himself—transmitting a draft of a proposed bill to the Speaker of the House of Representatives and the President of the Senate (*17*).

A bill of the Administration will normally be introduced by a Congressperson of the party that supports the concepts of the proposal. The proposed bill is then referred to the appropriate committee. After committee hearings on it, the bill will be redrafted during the so-called markup session. Subsequently, the bill will be voted on and, if passed, go to the floor of the Congress for debate.

When a bill is referred to a committee in Congress, the chairman of the committee transmits copies of the bill to Government departments or agencies concerned with the subject of the bill, and requests a report on the desirability of passing such a bill. Such reports are returned through the Office of Management and Budget (OMB) to determine whether the bill is consistent with the program of the President (*17*).

CONCLUSIONS

As we have shown, the process of agricultural policy formulation is in a state of flux. This period of uncertainty affects all participants in the process. Important questions remain to be answered. What weight will consumer interests receive? What positions will they take? How will the responsibilities for policy formulation be divided among committees of the Congress? What role will departments in the executive branch play in food policy decisions? The answer to these and other questions will significantly influence the future directions of agricultural and food policy.

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ALTERNATIVE ECONOMIC SETTINGS FOR AGRICULTURE: 1977-81

By
Cecil W. Davison and Milton H. Ericksen*

ABSTRACT

Policy planning for agriculture requires insight into possible courses of future economic events. Alternative economic settings for the U.S. agricultural sector, developed on the basis of specific assumptions, are presented to aid in this process. Year-to-year changes in domestic crop yields and in export levels are examined to illustrate the range in possible future conditions and to demonstrate the sensitivity of U.S. agriculture to yield and export levels.

KEYWORDS: Agricultural and food policy, policy planning, economic assumptions, projections, alternatives.

PREFACE

Someone once said that nothing is easier than predicting the future course of economic events, and that nothing is more likely to be wrong. A myriad of universal forces shape economic events, especially in U.S. agriculture. Speculation about future economic conditions must, therefore, weigh the impact of these forces in full appreciation of the unpredictability of natural elements, especially the most volatile one, human behavior.

Quite simply, it is not yet possible to *predict* the future with any degree of reliability. However, inability to predict the future does not mean that we should not consider it, nor prepare for it to the best of our ability. On the contrary, some notions of possible future economic conditions are essential for intelligent planning by individuals in all pursuits, by firms of all types, and by government at all levels. The design of policies and programs, especially those encompassing agriculture where weather compounds the uncertainties, necessitates exploring future economic settings in which these policies and programs might have to operate. Therein lies the genesis for and the orientation of this article.

We differentiate between predicting or forecasting the future and projecting alternative economic settings based upon simplifying assumptions. The projections presented here represent future economic conditions that would be expected *if* the assumptions upon which they are based materialized. They are not statements of what is expected to occur (as are forecasts or predictions), most likely to occur, or even what we personally think will occur. Rather, they are mere elaborations of futures which could be realized, and they have been prepared to offer insights into the impact of major forces and reference points in planning for an uncertain future.

The projections may show economic conditions that would be untenable. This possibility occurs because the projections neither incorporate actions policymakers might take nor situation-altering expectations which might result if agriculture appeared to be headed for an untenable situation. By not second-guessing policy actions or expectations, the projections remain consistent with the initial assumptions, thereby making it easier for the research analyst to look at the effects of alternative assumptions.

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In the remainder of the article, we first present a set of assumptions given to guide the projections effort. The resulting baseline projections for 1977-81 follow. We then demonstrate the sensitivity of the projections to yields and exports by showing two alternatives to the baseline. An analysis of the effects of random yield and export levels through the projection period is included as an appendix. Finally, we assess the implications of these analyses.

We are indebted to J.B. Penn and numerous other people in the Economic Research Service for their beneficial input and comments during preparation of this article. The projections presented were prepared by ERS analysts and staff from the following divisions, program areas, and groups:

Commodity Economics Division: Agricultural Policy Analysis; Dairy; Fibers; Forecast Support; Fruits, Vegetables, Sweeteners, and Tobacco; Grains and Feeds; Meat Animals; Oil Crops; Poultry.

Foreign Demand and Competition Division: Centrally Planned Countries; Commodities; Developed Countries; Developing Countries; Office of the Director.

National Economic Analysis Division: Sector Performance Measures, Economic Projections and Analytical Systems.

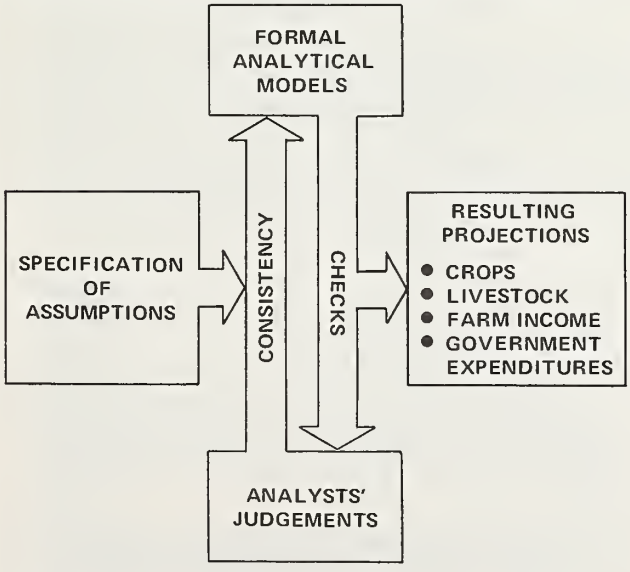
Computational assistance was provided by James Richardson, Oklahoma State University.

THE NATURE AND LIMITATIONS OF PROJECTIONS

Potential for misuse and misunderstanding arises any time projections or appraisals of the future are released to the public. Some users may view the projections as forecasts of actual quantities, prices, and values; however, it is generally recognized that neither economics nor any other discipline enables us to predict the future with infallibility. Yet we must attempt to explore possible impacts of weather, disease, pests, technology, availability and cost of inputs, world events, and other forces shaping agriculture. We therefore emphasize that the intermediate-term agricultural projections presented here are not forecasts, but rather projections that can be used in a comparative sense for evaluation and planning purposes.

The overall process used in developing these projections is illustrated in the figure. The first step in their preparation was to specify a set of assumptions defining a physical, environmental, economic, and policy setting for the projection period. Economic growth, the general price level, and population increases are part of these economic assumptions. The policy setting for agriculture is simplified by assuming that current policy legislation would extend through the projection period.

PROCEDURES FOR DEVELOPING PROJECTIONS



Using specified assumptions, projections for agriculture were developed by use of formal analytical models complemented by the judgment of experienced commodity analysts. Analytical models enable consistent analysis of large amounts of data under specified assumptions, especially when multiple sectors and numerous commodities are being considered. However, the reliability of models decreases as analyses extend into the more distant future. Also, future developments in variables outside the agricultural sector (technology, world economic conditions, climatic patterns, and policy provisions) cannot be foreseen; for this reason actual outcomes can and probably will differ greatly from those projected. Commodity analysts, proficient at explaining immediate events and at hypothesizing possible developments outside agriculture, may, nonetheless, be unable to account adequately for the effects of all the intercommodity relationships due to the large number of sectors, variables, and relationships involved. Proper handling of the intercommodity relationships is necessary for achieving consistency. Hence, the procedure used in preparing these projections utilizes the strengths of the models and draws upon the judgment of experienced analysts to obtain a consistent economic description of the agricultural economy.

These annual projections start from crop supply and use conditions that existed in mid-September and commodity program provisions as of early October 1976. Current year outlook is subject to re-evaluation when there are revisions in the crop report, changes in the export situation, or adjustments in the general economy. However, as we move farther into the future, each succeeding year is less influenced by near-term adjustments than by the

overall assumptions used to guide the development of the projections. Preparation and publication require considerable time; thus, when the projections become available to users, they are not likely (nor intended) to reflect the most recent estimates for the current period due to subsequent revisions reflecting changing conditions.[1]

Presentation of the projections begins with a listing of explicit assumptions which include projected yield and export levels. The set of projections developed by using these assumptions and the projected yields and exports is presented as Alternative 1. For purposes of our analysis this alternative constitutes baseline projections and is discussed in some detail. Because of the variability in yield and export levels, amply apparent from historical experience, and because yield and export levels are so important in the determination of price and income outcomes, Alternative 1 is only one of many possible economic settings.

To illustrate how projections would differ under alternative yield and export levels, two additional sets of projections are presented. Alternative 2 reflects a combination of lower yields and higher exports compared to Alternative 1, while Alternative 3 reflects higher yields and lower exports. The three alternatives indicate that the economic condition of U.S. agriculture is sensitive and responsive to changes in supply and demand conditions. However, the range in yields and exports considered in the three alternatives does not fully reflect the extremes that are possible. Also the sequence of yield or export levels is important in the determination of actual outcomes in succeeding years.

One option to the assumed 5 consecutive years of unchanging weather pattern (implicit in the yield and export levels for the alternatives but quite unlikely) would be to assume some yearly sequence of ideal, normal, and unfavorable weather. Hindsight lends great appeal to this approach; however, it is impractical for the analytical procedures available simply because there is no basis for selecting one particular sequence over another. Furthermore, it is not feasible to provide individual projections for all possible combinations of year-to-year sequences.

An analysis of yield-export sequences based on random draws of yields and exports is summarized and included as an appendix to this article. Here the ranges of possible yield and export levels approximate the extremes that might occur over the next several years. Because of the randomness, the results reflect many different sequences as indicated by the graphic presentation of some of the key variables. Overall, the analysis provides a perspective of the possible economic settings for agriculture in the near future.

ALTERNATIVE 1 (BASELINE) ASSUMPTIONS AND PROJECTIONS

MAJOR ASSUMPTIONS

The principal assumptions specified for development of the projections include the following:

(1) The increase in the consumer price index (CPI) during 1977 will approach 7 percent, thereafter slowing to an average annual increase of 5 to 6 percent through 1981.

(2) The U.S. civilian population will grow at an average annual rate of 0.8 percent from 1977 through 1981.

(3) Per capita disposable personal income in current dollars will increase at an annual average rate of 8 to 9 percent from 1977 through 1981.

(4) Yield and export projections which reflect normal weather conditions are derived by independent analyses.

(5) The commodity program provisions embodied in the Agriculture and Consumer Protection Act of 1973 are assumed to extend through 1981. The specific assumptions based on this program structure are as follows:

(a) There will be no form of production control such as set-aside or acreage limitations.

(b) The 1973 act established target price levels for 1974 and 1975 and thereafter required adjustments according to a specified formula. Target price projections through 1981 are based on projections of the formula variables.

(c) Loan rates, not specified by law, are assumed at the levels announced for 1977.[2]

(d) When market prices fall below target prices, deficiency payments are paid to farmers on the basis of their allotments. Allotment levels required in the calculation of deficiency payments are kept at 1976 or 1977 levels for the projection period. Since no production control is required, a participation rate of 100 percent is used in deficiency payment calculations.

ELABORATION OF KEY ASSUMPTIONS

Demand Level Considerations

Domestic demand projections, assessed on the basis of population growth, income, and consumer tastes and preferences, are guided by recent patterns of crop and

[1]The most recent information is published in USDA's *Agricultural Supply and Demand Estimates* report which is updated whenever near-term conditions change. It is available from the Outlook and Situation Board of USDA.

[2]Loan rate levels are set at the discretion of the Secretary of Agriculture within bounds prescribed by law. For details, see the article by Penn and Brown in this *Review*.

livestock utilization. Feed use, an important component of domestic demand for feed grains and soybeans, is based on livestock numbers and the relationship of feed prices to prices of livestock products. As projections extend from year to year, the interdependency of feed prices, feed demand, and cyclical livestock numbers is recognized.

Yields and Exports

Yield and export levels constitute major determinants of production, utilization, and carryover of grains. Committees of commodity analysts projected yields giving consideration to historical yield trends, projected acreage levels, the response to expected product price-input price relationships, and the judgement of the analysts. Although actual yields are heavily influenced by weather in any given year, the committees' projections are on the basis of normal weather conditions (table 1). "Normal," as used here, means weather that is neither ideal nor unfavorable for growing crops. If ideal weather were assumed, yields would naturally be higher; assuming unfavorable weather would mean lower yields. The assumed yields reflect the same normal weather conditions over the 5-year period.

Export projections derive from near-term and longer range world production and demand projections. Near-term production estimates (1976-78), developed for individual countries, assume normal weather and production trends modified to incorporate assumptions about changes in technology, productivity, and investment. Demand estimates assume world population and income growth rates averaging 2.0 and 2.7 percent, respectively, through 1978. Import requirements and/or export availabilities for individual countries were calculated as the difference between projected production and demand. U.S. exports were then calculated both on an individual country basis and as the residual needed to clear the world market.

Longer range projections (1979-81) of foreign demand for U.S. products were made with the use of an analytic model containing production, consumption, and trade functions for the 28 major regions of the world. Annual world population and income growth rates assumed for this period average 1.9 and 2.7 percent, respectively.

Policy Provisions

While future actions of policymakers and program administrators cannot be foreseen, assumptions must be made about policy provisions that might pertain over the projection period. The general procedure has been to rely on provisions that are directly specified by law while minimizing those that remain discretionary in nature.

Under current legislation, target prices are set by law; however, the Secretary of Agriculture has the authority to adjust loan rates and allotment levels and to add production controls to voluntary farm programs. Target price projections for 1977 to 1981 are shown in table 2. Loan rates, which provide a floor for market prices and can be used to encourage production and acquire Government stocks, were projected at levels shown in table 3. National acreage allotments for crops (table 4), divided among individual producers, have traditionally been the basis for determining an individual producer's share of set-aside and for allocating support payments. Under the 1973 act, they are used for determining deficiency and disaster payments, and, if needed, would be used in the administration of set-aside provisions. Although production controls were not assumed for the alternatives presented, they could be employed in the future to avoid or alleviate surplus stocks and depressed crop prices, just as trade restrictions or other measures could be used to restrain rapidly increasing prices.

Table 1.—Yield and export projections, 1976-81, with historical comparison

Item	Unit	Crop marketing years							
		Average 1970/71-74/75	1975/76[1]	1976/77[1]	1977/78	1978/79	1979/80	1980/81	1981/82
					Projections				
Yields:									
Feed grains	Tons/acre	1.86	1.93	1.89	2.06	2.06	2.08	2.11	2.15
Corn	Bu./acre	84.0	86.2	82.8	90.0	91.5	93.0	94.5	96.0
Wheat	Do.	31.6	30.6	30.4	31.0	31.6	32.4	33.0	33.5
Soybeans	Do.	26.6	28.4	25.8	28.2	28.6	28.7	29.0	29.3
Upland cotton	Lb./acre	468	451	449	480	480	480	480	480
Exports:									
Feed grains	Mil. tons	28.3	54.7	50.0	44.1	42.4	43.0	43.5	45.2
Corn	Mil. bu.	993	1,700	1,550	1,300	1,240	1,260	1,280	1,300
Wheat	Do.	943	1,173	1,050	1,080	1,110	1,140	1,170	1,200
Soybeans	Do.	458	555	525	560	560	590	615	650
Cotton	Mil. bales	4.5	3.3	4.4	4.5	4.5	4.5	4.7	4.7

[1] Published in USDA's September 1976 issue of *Agricultural Supply and Demand Estimates*, except soybean exports, which were published later in the October issue.

Table 2.—Current and projected target prices, 1974-81

Crop	Unit	Crop marketing years							
		1974/75	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82
					Projections				
Wheat	Dol./bu.	2.05	2.05	2.29	2.51	2.51	2.64	2.68	2.75
Upland cotton	Cents/lb.	38.0	38.0	43.2	48.8	49.2	51.2	52.1	54.5
Corn	Dol./bu.	1.38	1.38	1.57	1.75	1.75	1.82	1.82	1.87
Sorghum	Do.	1.31	1.31	1.49	1.66	1.66	1.73	1.73	1.78
Barley	Do.	1.13	1.13	1.28	1.43	1.43	1.48	1.48	1.52
Rice	Dol./cwt.	--	--	8.25	8.39	8.75	9.02	9.32	9.58

Note: Target price projections were calculated according to the formula specified in the 1973 act, using projected yields (table 1) and a projected Index of Prices Paid for Production Items, Interest, Taxes, and Wage Rates.

Table 3.—Current and projected loan rates, 1974-81

Crop	Unit	Crop marketing years							
		1974/75	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82
					Projections				
Wheat	Dol./bu.	1.37	1.37	2.25	2.25	2.25	2.25	2.25	2.25
Upland cotton	Cents/lb.	25.3	34.3	37.1	42.6	41.0	43.0	44.0	45.0
Corn	Dol./bu.	1.10	1.10	1.50	1.50	1.50	1.50	1.50	1.50
Sorghum	Do.	1.05	1.05	1.43	1.43	1.43	1.43	1.43	1.43
Barley	Do.	.90	.90	1.22	1.22	1.22	1.22	1.22	1.22
Oats	Do.	.54	.54	.72	.72	.72	.72	.72	.72
Rye	Do.	.89	.89	1.20	1.20	1.20	1.20	1.20	1.20
Soybeans	Do.	2.25	--	2.50	2.50	2.50	2.50	2.50	2.50
Rice	Dol./cwt.	7.54	8.52	6.19	6.30	6.57	6.77	7.00	7.20

Note: Loan rates for wheat, feed grains, rye, and soybeans were projected through 1981 at levels announced for 1976 and 1977 on October 13, 1976. Cotton loan rates for 1978-81 were determined as a constant percentage of a 3-year moving average of projected world prices as explained in the article by Penn and Brown. Rice loan rates were increased after 1976 proportional to rice target prices shown in table 2.

Table 4.—U.S. crop allotments, current and projected, 1974-81

Crops	1974	1975	1976	Projections				
				1977	1978	1979	1980	1981
	Million acres							
Feed grains	89	89	89	89	89	89	89	89
Wheat	55.0	53.5	61.6	62.2	62.2	62.2	62.2	62.2
Cotton	11	11	11	11	11	11	11	11
Rice	2.1	1.8	1.8	1.8	1.8	1.8	1.8	1.8

Note: Allotments were projected through 1981 at levels current as of October 1976.

PROJECTIONS

Crop Projections

The crop projections, reflecting the normal weather assumption and yield and export projections shown in table 1, present a general picture of growing grain inventories and declining farm prices during the first part of the period. Ending inventories decline after 1978 for feed grains and soybeans (tables 5 and 6). Even though projected feed grain utilization exceeds production after 1978, there is little price adjustment because of the substantial inventories. Wheat production in these projections exceeds utilization through 1980, boosting inventories to levels that traditionally would be viewed as surplus. Projected market prices are below target levels for most of the period, requiring Government deficiency payments. Wheat is the preferred and most profitable crop for farmers in many parts of the country and they would continue to produce wheat despite continuation of the conditions in which production exceeds utilization with lower market prices. The projections suggest that wheat has the potential to re-emerge as a surplus crop because of an indicated producer lag in curtailing production even in the face of building stocks and lower prices.

Table 5.—U.S. feed grain and wheat projections for 1976-81, with historical comparison, Alternative 1

Item	Unit	Crop marketing years							
		Average 1970/71-74/75	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82
						Projections			
Feed grains:									
Harvested acres	Mil. acres	100.5	104.8	107.0	105.9	106.0	104.2	103.4	103.7
Yield per harv. acre	Tons	1.86	1.93	1.89	2.06	2.06	2.08	2.11	2.15
Production	Mil. tons	187.6	202.4	202.4	218.2	218.6	217.2	218.3	223.0
Domestic use	Do.	159.7	148.2	151.4	161.2	171.6	179.2	179.7	182.7
Exports	Do.	34.9	54.7	50.0	44.1	42.4	43.0	43.5	45.2
Ending stocks	Do.	30.4	16.8	18.2	31.4	36.3	31.6	27.0	22.4
Prices (corn)									
Season average	Dol./bu.	1.91	2.55	2.55	2.10	2.00	1.95	2.00	2.00
Target	Do.	--	1.38	1.57	1.75	1.75	1.82	1.82	1.87
Loan	Do.	1.07	1.10	1.50	1.50	1.50	1.50	1.50	1.50
Allotment	Mil. acres	–	89	89	89	89	89	89	89
Wheat:									
Harvested acres	Do.	51.6	69.7	70.4	71.2	70.0	67.4	66.0	64.9
Yield per harv. acre	Bu.	31.3	30.6	30.4	31.0	31.6	32.4	33.0	33.5
Production	Mil. bu.	1,603	2,134	2,139	2,207	2,212	2,184	2,178	2,174
Domestic use	Do.	771	728	810	912	935	984	986	1,013
Exports	Do.	943	1,173	1,050	1,080	1,110	1,140	1,170	1,200
Ending stocks	Do.	635	665	946	1,162	1,330	1,391	1,414	1,376
Price									
Season average	Dol./bu.	2.49	3.52	3.10	2.70	2.40	2.45	2.50	2.65
Target	Do.	--	2.05	2.29	2.51	2.51	2.64	2.68	2.75
Loan	Do.	1.27	1.37	2.25	2.25	2.25	2.25	2.25	2.25
Allotment	Mil. acres	–	53.5	61.6	62.2	62.2	62.2	62.2	62.2

Table 6.—U.S. soybean and upland cotton projections for 1976-81, with historical comparison, Alternative 1

Item	Unit	Crop marketing years							
		Average 1970/71-74/75	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82
						Projections			
Soybeans:									
Harvested acres	Mil. acres	47.8	53.6	49.4	54.0	55.0	55.0	55.0	56.0
Yield per harv. acre	Bu.	26.5	28.4	25.8	28.2	28.6	28.7	29.0	29.3
Production	Mil. bu.	1,267	1,521	1,274	1,525	1,570	1,580	1,595	1,640
Domestic use	Do.	818	907	868	910	960	995	1,010	1,035
Exports	Do.	458	555	525	560	560	590	615	650
Ending stocks	Do.	117	244	125	180	230	225	195	150
Prices									
Season average	Dol./bu.	4.51	5.15	6.25	5.75	5.00	5.00	5.25	5.90
Target	Do.	--	--	--	--	--	--	--	--
Loan	Do.	2.25	--	2.50	2.50	2.50	2.50	2.50	2.50
Allotment	Mil. acres	--	--	--	--	--	--	--	--
Upland cotton:[1]									
Harvested acres	Do.	12.0	8.7	11.0	11.7	11.0	11.2	11.5	11.5
Yield per harv. acre	Lb.	469	451	449					
Production	Mil. bales	11.8	8.2	10.3					
Domestic use	Do.	7.5	7.2	6.6	6.5	7.0	7.0	6.9	7.0
Exports	Do.	4.5	3.4	4.4	4.5	4.5	4.5	4.7	4.7
Ending stocks	Do.	4.2	3.6	3.1					
Prices									
Season average	Dol./lb.	.33	.50						
Target	Do.	–	.38	.43	.49	.49	.51	.52	.54
Loan	Do.	.20	.34	.37	.43	.41	.43	.44	.45
Allotment	Mil. acres	--	11	11	11	11	11	11	11

[1] Current law prohibits cotton price and production forecasts by the Government. Although these are not forecasts, they could be misinterpreted as such.

Soybean production, historically responsive to market conditions, remains sensitive to market prices. When soybean utilization exceeds production after 1978, prices are projected to be responsive due to relatively lower inventories. Increasing soybean prices shown by the projections for 1980-81 would likely lead to expanded production (table 6).

The supply and demand picture for the 1977-81 projection period is likely to be more unsettled for feed grains, soybeans, and cotton than wheat. This is so because the 1976 ending inventories for feed grains, soybeans, and cotton would not provide much cushion for lower yields or larger exports (tables 5 and 6). Either lower yields or larger exports for 1977 than those of Alternative 1 would result in lower ending stock levels, a situation that focuses attention on product prices, food costs, and available supplies for export. Planted acreage projections for the seven major crops indicate declining acreages for the price-declining grains with cotton and soybean acreage remaining relatively constant (table 7).

Livestock Projections

By the end of 1976, the cattle and calf inventory will be considerably reduced from the 1974 level. Under projected conditions beef production declines through 1978, but reverses this downtrend in 1979, reflecting a growing cattle inventory and increased cattle feeding (table 8). Beef prices rise throughout the projection period, reflecting an expanded demand due to increased population and consumer income.

Pork production shows substantial increases in the early years of the projections as it recovers from a cyclical low production point. As with beef, the production increases are inversely related to the price of corn.

By and large the poultry picture remains steady with some growth in broiler production. Because broiler production can increase more rapidly than beef in response to favorable prices, broiler prices do not strengthen as much as cattle prices throughout the projected period.

Demand for milk also grows as shown by the expanding production. Milk prices tend to rise steadily, reflecting an assumed continued increase in Government price supports. Since dairy profits are sensitive to feed prices, the combination of the supported milk price and declining feed prices provides impetus for the projected growth in production.

Net Farm Income

Two points are to be noted about the income summary (table 8). First, it pertains to the entire agricultural sector, not just the selected commodities shown in the projections. Second, the summary income variable represents realized net income, not total net income. Whereas total net income is adjusted for net change in farm inventories, realized net income is not.

The percentage of total farm receipts attributed to livestock through the projection period reverses a 1972-74 trend where crop cash receipts increased faster than livestock receipts. Assuming continued target price adjustment from the 1976 levels, deficiency payments plus other Government payment projections exceed an annual rate of $1.0 billion beginning in 1978. The continued rise in production expenses is a factor responsible for little change in realized net farm income (current dollars) over 1977-81. Inflation would erode the purchasing power of farm income as indicated by the assumed CPI increases listed in the guiding assumptions. Thus, the projected net farm income of $24.5 billion in 1981 is considerably below 1974 and 1975 levels in terms of real income.

The projections illustrate that farmers are price takers in their product markets. When production exceeds utilization in the short run, commodity prices may well drop or stagnate independently of inflationary pressures in the rest of the economy, as exemplified by the Alternative 1 projections.

Table 7.—U.S. planted acre projections, seven major crops for 1977-81, with historical comparison, Alternative 1

Crop	Crop marketing years							
	Average 1970/71-74/75	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82
	Million acres							
Feed grains:								
Corn	71.5	77.9	84.1	81.0	80.0	78.0	77.0	77.0
Oats	20.7	17.4	17.6	17.4	17.4	17.8	18.0	18.0
Barley	10.5	9.5	9.2	9.2	9.2	9.2	9.1	9.2
Sorghum	18.4	18.3	18.4	18.0	17.9	18.2	18.2	18.0
Total	121.1	123.1	129.3	125.6	124.5	123.2	122.3	122.2
Cotton	12.9	9.4	11.7	12.5	11.8	12.0	12.3	12.3
Soybeans	48.7	54.6	50.3	55.0	56.0	56.0	56.0	57.0
Wheat	57.6	75.1	80.2	80.0	78.0	74.1	72.5	71.3
Total	240.3	262.2	271.5	273.1	270.3	265.3	263.1	262.8

Table 8.—U.S. livestock and farm income projections for 1976-81, with historical comparison, Alternative 1

Item	Average 1970-74	1975	1976	1977	1978	1979	1980	1981
				Billion pounds				
Livestock:[1]								
Production								
Beef and veal	22.2	24.8	25.8	24.4	23.9	25.0	26.0	26.5
Pork	13.6	11.5	12.0	13.6	13.5	14.8	14.3	14.8
Chicken	8.7	8.8	9.8	9.9	10.3	10.3	10.6	10.6
Milk	117.3	115.5	119.6	120.6	121.5	122.5	123.5	124.0
				Dollars per hundredweight				
Farm prices:								
Cattle	33.6	32.3	33.1	36.2	45.2	47.0	49.0	52.0
Hogs	27.6	46.1	43.4	36.7	40.8	40.0	44.0	43.0
Broilers	17.4	24.9	23.8	23.0	25.0	23.0	25.0	24.0
Milk	6.62	8.75	9.67	9.44	9.60	10.18	10.78	11.45
				Billion dollars				
Farm income:								
Total crop receipts	32.2	46.7	48.5	48.4	47.8	47.9	48.3	50.7
Total livestock receipts	36.6	42.9	46.2	46.0	51.9	55.0	59.2	62.2
Total Government payments	2.8	.8	.8	.8	1.0	1.2	1.1	1.0
Realized nonmoney and other farm income	5.3	7.8	8.5	8.5	8.6	8.7	8.9	9.0
Realized gross income	77.0	98.2	104.0	103.7	109.3	112.8	117.5	122.9
Total production expenses	56.4	75.5	80.3	81.7	86.0	90.2	94.6	98.4
Realized net farm income	20.2	22.7	23.7	22.0	23.3	22.6	22.9	24.5

[1] Red meat production is expressed in carcass weight, poultry in ready-to-cook weight. Livestock prices are on a live weight basis.

ALTERNATIVE PROJECTIONS WITH HIGHER AND LOWER YIELD AND EXPORT LEVELS

The Alternative 1 projections presented above were based on the yield and export levels summarized in table 1. A series of both higher and lower yield and export levels was obtained by adding and subtracting a fixed increment to the table 1 yield and export levels. The increment in each case is equal to 40 percent of historically calculated standard errors for the individual yield and export series (table 9). This amount was selected after reviewing the results of alternative adjustment levels that gave higher (or lower) yield and export series. Given the analytic procedures used, a wider adjustment level resulted in feed grain ending stocks which were unrealistically low in Alternative 2 or wheat ending stocks which were unrealistically high in Alternative 3.

Alternative 2 and Alternative 3 projections, using these higher and lower yield and export levels, were derived through the use of a simulation system in which the Alternative 1 projections were a base situation.[3] The simulator recalculated all projection values using appropriate response parameters given the alternative yield and export series. All other assumptions remained unchanged.

ALTERNATIVE 2

Alternative 2 projections are based on a combination of lower yields and higher exports in comparison to Alternative 1 (table 9). The result is higher prices, higher realized net farm income, and lower ending stock levels for crops (tables 10-15). Production of both livestock products and crops is less. Crop production is reduced because of lower yields even though expanded acreage offsets the lower yields to some degree.

Livestock production is lower because of higher feed prices. Farm income is higher under Alternative 2 compared to Alternative 1 as a result of higher receipts for both crops and livestock. However, the larger receipts are offset somewhat by greater production costs and decreased Government payments. Production costs increase because of larger acreages, higher feed costs, and the incentive to add more inputs because of higher product prices. Government payments decrease in this case because the higher prices preclude deficiency payments in comparison to Alternative 1 where deficiency payments are required for wheat (table 15). In short, the tighter supply-demand situation in Alternative 2 which results

[3] A policy simulation model was used to calculate the price, production, and income projections that resulted for the different yield and export combinations. The model is described in the article by Daryll Ray and T. Moriak, "POLYSIM: A National Agricultural Policy Simulator," *Agricultural Economics Research*, Vol. 28, No. 1, Jan. 1976, pp. 14-21.

Table 9.—Yield and export levels for alternative projections

Item	Unit	Crop marketing years					
		1976/77[1]	1977/78	1978/79	1979/80	1980/81	1981/82
		Yields					
Feed grains:	Tons/acre						
Alternative 2		1.89	2.02	2.02	2.04	2.07	2.11
Alternative 3		1.89	2.10	2.10	2.12	2.15	2.19
Wheat:	Bu./acre						
Alternative 2		30.4	30.3	30.9	31.7	32.3	32.8
Alternative 3		30.4	31.7	32.3	33.1	33.7	34.2
Soybeans:	Do.						
Alternative 2		25.8	27.7	28.1	28.2	28.5	28.8
Alternative 3		25.8	28.7	29.1	29.2	29.5	29.8
Cotton:	Lb./acre						
Alternative 2		449	465	465	465	465	465
Alternative 3		449	495	495	495	495	495
		Exports					
Feed grains:	Mil. tons						
Alternative 3		46.0	41.5	39.8	40.4	40.9	42.6
Alternative 2		54.0	46.7	45.0	45.6	46.1	47.8
Wheat:	Mil. bu.						
Alternative 3		950	1,014	1,044	1,074	1,104	1,134
Alternative 2		1,150	1,146	1,176	1,206	1,236	1,266
Soybeans:	Do.						
Alternative 3		495	544	544	574	599	634
Alternative 2		555	576	576	606	631	666
Cotton:	Mil. bales						
Alternative 3		4.1	4.0	4.0	4.0	4.2	4.2
Alternative 2		4.7	5.0	5.0	5.0	5.2	5.2

[1] Export ranges for 1976/77 are from USDA's *Agricultural Supply and Demand Estimates*, September, 1976.

Table 10.—Alternative U.S. feed grain projections for 1976-81, with historical comparison

Item	Unit	Crop marketing years							
		Average 1970/74	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82
						Projections			
Alternative 2 (lower yields, higher exports):									
Harvested acres	Mil. acres	100.5	104.8	107.0	106.0	106.5	105.3	104.9	105.5
Yield per harv. acre	Tons	1.86	1.93	1.89	2.02	2.02	2.04	2.07	2.11
Production	Mil. tons	187.6	202.4	202.4	213.6	214.7	214.3	216.8	222.1
Domestic use	Do.	159.7	148.2	151.2	160.2	169.3	175.9	176.2	178.9
Exports	Do.	34.9	54.7	54.0	46.7	45.0	45.6	46.1	47.8
Ending stocks	Do.	30.4	16.8	14.4	21.4	22.2	15.3	10.1	5.9
Season price (corn)	Dol./bu.	1.91	2.55	2.68	2.37	2.36	2.36	2.45	2.83
Target price (corn)	Do.	--	1.38	1.57	1.73	1.73	1.81	1.84	1.91
Alternative 3 (higher yields, lower exports):									
Harvested acres	Mil. acres	100.5	104.8	107.0	105.9	105.5	102.9	101.6	101.6
Yield per harv. acre	Tons	1.86	1.93	1.89	2.10	2.10	2.12	2.15	2.19
Production	Mil. tons	187.6	202.4	202.4	222.7	222.0	218.6	218.8	222.8
Domestic use	Do.	159.7	148.4	151.6	162.2	174.0	182.0	182.2	184.8
Exports	Do.	34.9	54.7	46.0	41.5	39.8	40.4	40.9	42.6
Ending stocks	Do.	30.4	16.8	22.0	41.3	49.7	46.2	42.1	37.8
Season price (corn)	Dol./bu.	1.91	2.55	2.42	1.83	1.65	1.58	1.61	1.62
Target price (corn)	Do.	–	1.38	1.57	1.73	1.73	1.78	1.79	1.85

Table 11.—Alternative U.S. wheat projections for 1976-81, with historical comparison

Item	Unit	Crop marketing years							
		Average 1970/74	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82
		Projections							
Alternative 2 (lower yields, higher exports):									
Harvested acres	Mil. acres	51.6	69.7	70.4	71.5	70.6	68.2	67.0	66.1
Yield per harv. acre	Bu.	31.3	30.6	30.4	30.3	30.9	31.7	32.3	32.8
Production	Mil. bu.	1,603	2,134	2,139	2,168	2,182	2,163	2,165	2,169
Domestic use	Do.	771	728	804	897	911	951	946	976
Exports	Do.	943	1,173	1,150	1,146	1,176	1,206	1,236	1,266
Ending stocks	Do.	635	665	852	979	1,075	1,081	1,065	993
Season price	Dol./bu.	2.49	3.52	3.32	3.04	2.80	2.94	3.05	3.28
Target price	Do.	--	2.05	2.29	2.51	2.52	2.66	2.73	2.79
Alternative 3 (higher yields, lower exports):									
Harvested acres	Mil. acres	51.6	69.7	70.4	70.9	69.4	67.3	66.1	64.9
Yield per harv. acre	Bu.	31.3	30.6	30.4	31.7	32.3	33.1	33.7	34.2
Production	Mil. bu.	1,603	2,134	2,139	2,246	2,241	2,227	2,225	2,219
Domestic use	Do.	771	728	816	927	944	992	996	1,029
Exports	Do.	943	1,173	950	1,014	1,044	1,074	1,104	1,134
Ending stocks	Do.	635	665	1,040	1,345	1,589	1,725	1,811	1,868
Season price	Dol./bu.	2.49	3.52	2.88	2.36	2.25	2.25	2.25	2.31
Target price	Do.	--	2.05	2.29	2.51	2.51	2.62	2.64	2.71

Table 12.—Alternative U.S. soybean projections for 1976-81, with historical comparison

Item	Unit	Crop marketing years							
		Average 1970/74	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82
		Projections							
Alternative 2 (lower yields, higher exports):									
Harvested acres	Mil. acres	47.8	53.6	49.4	54.0	54.6	54.0	53.6	54.4
Yield per harv. acre	Bu.	26.5	28.4	25.8	27.7	28.1	28.2	28.5	28.8
Production	Mil. bu.	1,267	1,521	1,274	1,496	1,535	1,524	1,529	1,569
Domestic use	Do.	818	907	857	881	914	930	929	942
Exports	Do.	458	555	555	576	576	606	631	666
Ending stocks	Do.	117	244	106	145	190	179	148	108
Season price	Dol./bu.	4.51	5.15	6.50	6.20	5.49	5.62	5.99	6.76
Target price	Do.	--	--	--	--	--	--	--	--
Alternative 3 (higher yields, lower exports):									
Harvested acres	Mil. acres	47.8	53.6	49.4	54.0	55.5	55.8	55.9	57.0
Yield per harv. acre	Bu.	26.5	28.4	25.8	28.7	29.1	29.2	29.5	29.8
Production	Mil. bu.	1,267	1,521	1,274	1,549	1,613	1,627	1,649	1,698
Domestic use	Do.	818	907	879	937	1,007	1,059	1,085	1,116
Exports	Do.	458	555	495	544	544	574	599	634
Ending stocks	Do.	117	244	144	213	274	269	234	182
Season price	Dol./bu.	4.51	5.15	6.00	5.33	4.48	4.41	4.60	5.18
Target price	Do.	--	--	--	--	--	--	--	--

from lower yields and higher exports gives an improved aggregate economic situation for farmers.

ALTERNATIVE 3

In comparison to Alternative 1, Alternative 3 shows the effect of higher yields and lower exports. Production expands and prices fall which results in realized net farm income below Alternative 1 levels. Net farm income would have decreased even more without Government payments (table 15). For 1981, Government payments of $3.4 billion, which include deficiency payments of $2.6 billion, are nearly 15 percent of the total $23.3 billion net farm income.

Table 13.—Alternative U.S. upland cotton projections for 1976-81, with historical comparison

Item	Unit	Crop marketing years							
		Average 1970/74	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82
		Projections							
Alternative 2 (lower yields, higher exports):									
Harvested acres	Mil. acres	12.0	8.7	11.0	11.8	11.4	11.8	12.2	12.2
Yield per harv. acre	Lb.	469	451	449					
Production	Mil. bales	11.8	8.2	10.3					
Domestic use	Do.	7.5	7.2	6.6	6.4	6.8	6.7	6.6	6.7
Exports	Do.	4.5	3.3	4.7	5.0	5.0	5.0	5.2	5.2
Ending stocks	Do.	4.2	3.6	2.8					
Season price	Dol./lb.	.33	.50						
Target price	Do.	.38	.38	.43	.49	.50	.52	.54	.56
Alternative 3 (higher yields, lower exports):									
Harvested acres	Mil. acres	12.0	8.7	11.0	11.6	10.6	10.6	10.8	10.8
Yield per harv. acre	Lb.	469	451	449					
Production	Mil. bales	11.8	8.2	10.3					
Domestic use	Do.	7.5	7.2	6.6	6.6	7.2	7.3	7.2	7.3
Exports	Do.	4.5	3.3	4.1	4.0	4.0	4.0	4.2	4.2
Ending stocks	Do.	4.2	3.6	3.4					
Season price	Dol./lb.	.33	.50						
Target price	Do.	.38	.38	.43	.49	.49	.50	.51	.53

Note: Current law prohibits cotton price and production forecasts by the Government. Although these are not forecasts, they could be misinterpreted as such.

Table 14.—Alternative U.S. livestock projections for 1976-81, with historical comparison

Item	Unit	Average 1970/74	1975	1976	1977	1978	1979	1980	1981
		Projections							
Alternative 2 (lower yields, higher exports):									
Production									
Beef and veal	Bil. lb.	22.2	24.8	25.8	24.3	23.8	24.8	25.8	26.3
Pork	Do.	13.5	11.5	12.0	13.4	13.1	14.2	13.7	14.1
Chicken	Do.	8.7	8.8	9.8	9.8	10.0	9.9	10.1	10.1
Milk	Do.	117.3	115.6	119.6	120.4	121.2	122.1	123.1	123.5
Farm prices									
Cattle	Dol./lb.	.336	.323	.331	.369	.471	.496	.521	.554
Hogs	Do.	.276	.461	.434	.379	.439	.439	.492	.481
Broilers	Do.	.174	.249	.238	.236	.265	.249	.274	.264
Milk	Dol./cwt.	6.62	8.75	9.67	9.50	9.74	10.37	11.02	11.71
Alternative 3 (higher yields, lower exports):									
Production									
Beef and veal	Bil. lb.	22.2	24.8	25.8	24.5	24.0	25.1	26.1	26.6
Pork	Do.	13.6	11.5	12.0	13.8	13.9	15.3	14.9	15.4
Chicken	Do.	8.7	8.8	9.8	10.0	10.5	10.6	11.0	11.0
Milk	Do.	117.3	115.5	119.6	120.7	121.8	122.9	123.9	124.4
Farm prices									
Cattle	Dol./lb.	.336	.323	.331	.355	.433	.446	.463	.491
Hogs	Do.	.276	.461	.434	.355	.377	.363	.395	.386
Broilers	Do.	.174	.249	.238	.224	.235	.212	.229	.219
Milk	Dol./cwt.	6.62	8.75	9.67	9.38	9.46	10.00	10.57	11.23

Table 15.—Alternative U.S. farm income projections for 1976-81, with historical comparison

Item	Average 1970-74	1975	1976	1977	1978	1979	1980	1981
	Billion dollars							
Alternative 2 (lower yields, higher exports):								
Total crop receipts	32.2	46.7	49.2	50.4	50.9	51.8	52.8	56.3
Total livestock receipts	36.6	42.9	46.2	46.7	53.5	57.4	62.1	65.3
Total Government payments	2.8	.8	.8	.8	.8	.8	.7	.8
Realized nonmoney and other farm income	5.3	7.8	8.5	8.5	8.6	8.7	9.0	9.1
Realized gross income	77.0	98.2	104.7	106.4	113.8	118.7	124.6	131.5
Total production expenses	56.4	75.5	81.2	83.3	88.1	93.1	98.0	103.8
Realized net farm income	20.2	22.7	23.5	23.1	25.7	25.6	26.6	27.7
Alternative 3 (higher yields, lower exports):								
Total crop receipts	32.2	46.7	47.8	46.3	45.0	44.6	44.7	46.8
Total livestock receipts	36.6	42.9	46.2	45.3	50.1	52.7	56.5	59.3
Total Government payments	2.8	.8	.8	1.2	2.0	2.9	2.7	3.4
Realized nonmoney and other farm income	5.3	7.8	8.5	8.5	8.6	8.6	8.8	8.9
Realized gross income	77.0	98.2	103.3	101.3	105.7	108.8	112.7	118.4
Total production expenses	56.4	75.5	79.5	80.1	83.8	87.5	91.6	95.1
Realized net farm income	20.2	22.7	23.8	21.2	21.9	21.3	21.1	23.3

SUMMARY

The alternative projections illustrate how agriculture might adjust to different supply-demand situations. The only differences among the three alternatives were in the assumed yield and export levels. Alternative 3 shows how Government programs, deficiency payments in this case, can improve the economic situation on farms in times of plentiful supplies. As noted, Alternatives 2 and 3 do not illustrate possible extreme situations because yields and exports could vary more than has been indicated; more variation plus the timing of variations could bring about quite different results. Larger exports and/or lower yields than those in Alternative 2 could push prices even higher than those shown. Accordingly, lower exports and higher yields than those in Alternative 3 could amplify the price-depressing effects indicated, and increase the need for Government support payments.

These three alternatives can be useful as a starting point for further analysis. They indicate the rather narrow path that exists between an agriculture that requires program support and an agriculture characterized by rising prices and, possibly, U.S. restrictions on exports.

IMPLICATIONS AND EVALUATION

It was stated early in this article that the motivation for preparation and presentation of alternative projections was to aid in contingency planning for an uncertain future. Having presented the projections, it seems appropriate to attempt to distill the salient implications from them.

The projections indicate that U.S. agriculture could move from conditions of relative surplus to relative shortage or vice versa during the next 5 years. This suggests that future policies need to incorporate contingencies capable of responding to *either* eventuality: that is, they need to be designed with flexibility sufficient for coping with surplus conditions, low farm product prices and incomes as well as conditions that generate high product prices, high farm incomes, and increased food costs.

U.S. consumers appear to be insulated from severe or prolonged domestic food shortages in the alternatives presented, but they do not have the same assurance that food prices will not, on occasion, increase significantly. Conditions such as poor crops in successive years and high levels of exports could combine periodically to bring this about.

The projections suggest that farm prices and incomes respond quickly and directly to changes in yields and exports, at least of the magnitude considered in this study. The high productive capability of the U.S. agricultural sector is clearly illustrated. Food production well in excess of domestic requirements is possible, and several successive years of good crops in the absence of rapidly expanding export demand could lead to conditions of the sixties, a situation characterized by overproduction, growing surpluses, and depressed farm prices and incomes. Contrarily, a succession of poor crop years in the United States (low yields) coupled with poor crops worldwide (increased exports of U.S. agricultural products) could produce the reverse situation.

The projections have precluded changes in Government policies and programs. Generally, the minimal pro-

visions of the 1973 act were assumed to continue in force throughout the projection period. Clearly, however, economic conditions in agriculture could develop to necessitate policy and/or program changes. For instance, the alternatives show aggregate farm income levels that may be unacceptably low, a situation which would likely precipitate policy actions to counteract the tendency. We did not attempt to anticipate such actions. Whenever the loan rates become a price floor for a commodity, the Government is automatically creating a grain reserve. When stocks are accumulated through the CCC nonrecourse loan program and the loans are not redeemed, the Government gains control of quantities of grain which must be stored, managed, and eventually disposed of by some means.

Aggregate farm income levels are very sensitive to product price and quantity changes and to Government payment levels. The projections underscore the contention that the economic health of the agricultural sector can be different from that of the national economy as a whole. It should not be assumed that the economic well-being of agriculture necessarily follows the aggregate income indexes for the remainder of the economy, at least in a shortrun, year-to-year context. Primarily due to weather conditions, economic conditions in agriculture could be quite unfavorable at the same time that overall economic activity is strong.

If the programs of the 1973 act were to be continued, as assumed, the projections indicate that under certain conditions there is a possibility for rather large deficiency payments. The potential amounts are directly related to the magnitude of the differential between the loan rates and target prices as well as allotment levels. Thus, when considering potential U.S. Treasury costs under possible economic futures, this differential plus allotment levels comprise the primary determinants.

The clear possibilities suggested by the stocks' ranges are that either extremely tight supply situations or serious surpluses could result, the prime determinants being weather and export sales. While these may be viewed as bounds, the analysis also suggests a potential for wide year-to-year fluctuations. This potential for wide swings in farm product prices and incomes would suggest needed attention to whether the farm sector can cope on its own with the attendant risk and uncertainty. That is, are present institutions adequate for enabling producers to handle this level of risk and uncertainty? Are new institutions necessary? How would the structure of the farming sector be affected? Is it in the best interests of society to allow the sector to bear the risk alone, or is it advantageous for society as a whole to assume some part? These are the kinds of issues that would emerge if the potential variability suggested by the analysis should eventuate.

Closely related are issues tied to moderating variability. If policymakers (society) wish to preclude the extremes, the question arises as to how much variability should be removed and how much should be allowed to remain; how much is necessary to make the best use of the market as an allocative mechanism?

Net farm income has been viewed traditionally as a highly visible indicator of the health of the agricultural sector. Past policies and programs have been oriented toward "improving" or "maintaining" farm incomes, but a policy question needing attention for the future is what constitutes an adequate or acceptable level of farm income? Still more fundamental, is farm income the appropriate indicator of sector performance and economic health? If so, at what point or level of income is Government action necessary to "improve" or "maintain" it? What is an appropriate income balance between crop producers and livestock producers? While aggregate net farm income is the focal statistic, the projections indicate there are trade-offs inherent between the livestock and crop sectors. Efforts to improve the income of one group may have offsetting impacts on the other.

Related to the area of Government involvement in agriculture is the question of Treasury costs. In the current and future policy environments, what level of Government costs in the farm sector is acceptable in the aggregate, and how should this "transfer" be allocated among the potential recipients within the sector?

The projections also provide implications by what they do not show. Not being forecasts, they demonstrate only possibilities, not probabilities. The wide range of possibilities and the large number of factors determining which finally occurs stresses the importance of timely and accurate information and forecasting systems. The projections do not indicate financial stress that could be present in segments of the sector nor do they indicate cash flow magnitudes or investment capital availability. They do not provide a financial picture of the various types of farms nor any notions of economic conditions which might prevail at the micro or firm level. Further, we have not explored relationships between commodity prices and food prices, the CPI, overall impacts on inflation rates, impacts on low income consumers, implications for the domestic food aid programs, and other areas where the agricultural economy merges into the larger domestic economy. These are important areas and ones to which analysts must devote concerted effort in the future.

The projections do emphasize the significant impact of yields (weather) and exports on the domestic agricultural economy. Ironically, these are two areas in which our prediction abilities are rudimentary. Their importance would suggest that extensive study is needed, namely, weather and climatic influences on agriculture domestically and worldwide, and on the *modus operandi* of the export markets for our products. Perhaps improved intelligence in both these areas would serve to add stability, decreasing the potential volatility suggested by these analyses.

APPENDIX: ANALYSIS OF YIELD-EXPORT SEQUENCES

The yield and export levels used in deriving the projections presented in the body of the article do not reflect the unpredictable year-to-year variation observed in historical data series. Each of the three sets of projections, based on their respective yield and export assumptions, assumes that those conditions prevail in each of the years of the projections period. However, in reality, those conditions are highly unlikely to materialize. The 5-year average of two different yield series (or export series) might be equal, yet the implied outcomes in terms of commodity prices, carryout levels, and net farm income could be quite different depending on the sequential order of yield or export levels.

In the analysis that follows, crop yields and exports were independently and randomly determined for each year of the projection period in an attempt to simulate more realistically the possible erratic movements of these variables. Price, production, and income projections were sequentially calculated for each year using randomly selected yields and exports. The random yields and exports were drawn from normal distributions with means set at the yield and export levels used for the Alternative 1 (baseline) projections. Variances for the distributions were derived from historically based standard errors.[1]

A 6-year projection using randomly selected yields and exports would only illustrate one of countless possible combinations of prices and quantities, both within individual years and among successive years. To add the dimension of relative frequency to the possible outcomes (influenced by the parameters of the distributions of yields and exports, the prices and quantities at the beginning of the projection period, and the assumptions stated), the 6-year sequence 1976-81 was repeated 300 times. This random selection procedure was modified for 1976 because, at the time these projections were developed, we were already into or nearly into the 1976/77 crop years for the commodities being considered. Consequently, Statistical Reporting Service yield estimates for 1976 and export forecasts approved by the Situation and Outlook Board for 1976/77 were used to limit 1976 yield and export possibilities.[2] The appendix table is a summary of the smallest and largest values drawn and the means of all yield and export values drawn.

The lowest, highest, and average of yields and exports randomly drawn from normal distributions, 1976-81

Commodity	Unit	Lowest	Average	Highest
Yields:				
Feed grains	Tons/acre	1.71	2.06	2.5
Corn	Bu./acre	76	92	111
Wheat	Do.	26.3	32.0	39.2
Soybeans	Do.	24.5	28.3	33.0
Cotton	Lb./acre	421	474	533
Exports:				
Feed grains	Mil. tons	19.2	44.8	66.3
Wheat	Mil. bu.	643	1,127	1,680
Soybeans	Do.	426	583	732
Cotton	Mil. bales	.6	4.5	8.4

Note: These lowest and highest yield and export values, drawn from normal distributions with means set at Alternative 1 (baseline) levels, encompass the 1976-81 period. They are not the 40-percent standard error adjustments used in Alternatives 2 and 3 in the main text.

Results of the random yield and export analysis are summarized for selected variables in appendix figures 1 through 10. The left panel of each figure shows the range of possible levels for the indicated variables for each of the 6 years. The ranges for 1976 projections are much narrower than the 1977-81 ranges because of constant yields and narrower bounds on possible export levels for 1976. The right frame of each figure indicates the relative frequency of calculated values occurring over 1977-81. The percentages were calculated on the basis of 1,500 values (repeating the 5-year projection period 300 times). The 1976 values were not included in the frequency determination because of the narrower ranges that resulted from the special constraints put on the 1976 yield and export levels.

Information shown in the figures can be interpreted as follows. In appendix figure 1, for example, the average of all corn prices calculated for 1977 is $2.10 per bushel. This is an average of 300 calculated corn prices that ranged from a high of $3.04 to a low of $1.50. The relative frequency bar graph shows how often calculated prices fell within a particular price range over the entire 1977-81 period. Ten percent, or 150, of the 1,500 calculated corn prices fell within the $1.50 to $1.59 range. The price range with the highest relative frequency is that of $2.00 to $2.09 per bushel, containing 13 percent of the price projections. The corn price range was widest in 1977 reflecting the relatively low expected carryout from 1976. A combination of low feed grain yields and strong exports could lead to high corn (feed grain) prices in 1977. A combination of high corn yields and low exports could produce high carryout levels in any year.

[1] Yield selections were made independently of the export selections. Yields for the different crops were related by historically calculated covariances as were exports for the different crops. The simulation model, POLYSIM, was used to calculate the price, production, and income projections resulting from the various yield and export combinations drawn.

[2] At the time the projections were being completed, the September 1, 1976, crop report had been issued, as had the September 13, 1976, *Supply and Demand Estimates* report. Yields for 1976 were held constant at the levels reported in the September 1 report. The randomly selected export levels for 1976 were constrained to the export "ranges" given in the *Supply and Demand Estimates* report. These ranges were considerably narrower than the ranges that would have been drawn from the specified normal distributions. From a technical standpoint, the random selections for the 1976 exports were drawn from a triangular distribution.

Wheat price maximums increase over time (app. fig. 3). Expected wheat carryout from 1976 is substantial, a factor which could cushion larger exports or lower yields through 1978. Continued low yields or strong exports thereafter could result in upward price movements.

Soybean prices are projected to continue their decline during the first part of the period as inventories grow (app. figs. 5 and 6). As projected inventories decline after 1979, prices strengthen with levels showing a $4 range.

The effect of feed prices on cattle and calf prices and production is evident from the ranges in appendix figures 7 and 8. The figures show an obvious lag in response in the short run (1977), but thereafter the range is quite uniform.

The upper end of the range on all Government payments also increased over time (app. fig. 9), reflecting increased target prices and deficiency payments. The potential size of deficiency payments is directly related to the difference between target prices and loan rates, assuming no change in allotments. Deficiency payments could be potentially large as target prices advance; however, the calculated frequency of the larger payments is quite low.

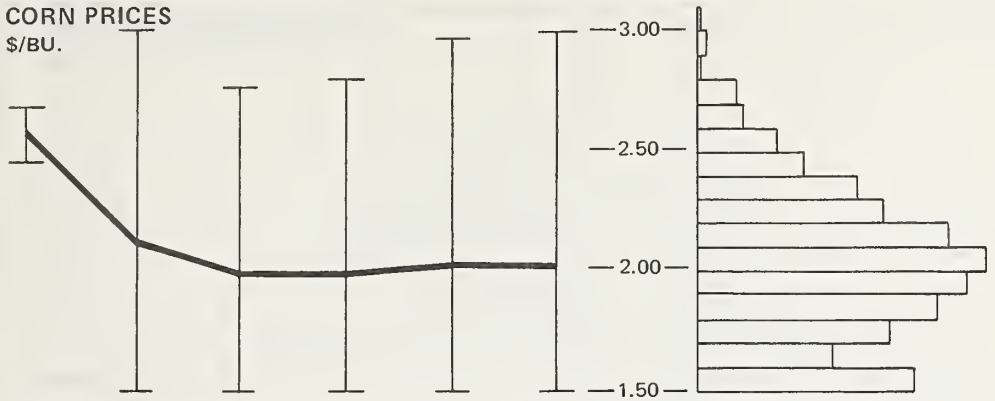
The narrower range of realized net farm income in 1977 (app. fig. 10) is a direct result of the narrower ranges in cattle and calf production and prices for that same year. The frequency of either high or low income is quite low. The increase in maximum income after 1979 reflects either the increased potential for larger Government payments or the higher price maximums. These two factors are offsetting, blunting potentially higher maximums. The minimum levels of realized net income show little change after 1978. Since target prices are adjusted by changes in the Index of Prices Paid for Production Items, Interest, Taxes, and Wage Rates, some built-in protection exists against continued increases in production costs. The loan rates which serve as price floors also help prevent the possibility of even lower realized net income, a figure highly sensitive to price levels.

Although the charts summarize only a few selected variables, they are sufficient to give a general indication of the wide range of possible situations for agriculture when sequential variation is considered. Some policy provisions and working assumptions are reflected in the charts. The lower ranges of wheat and corn prices are supported by the loan rates announced in October 1976. There is some indication that unsupported corn and wheat market prices would have gone below the loan rate levels because of the large relative frequency of the lower price ranges (app. figs. 1 and 3). Ending year crop inventories were assigned minimum levels to reflect working stocks. If calculated ending year inventories went below the minimum level, utilization was decreased to bring the ending year inventory back up to the minimum level. The feed grain minimum of 5 million tons was reached in 4 of the 6 years. A basic annual Government payment of $700 million was projected to account for disaster payments, conservation payments, wool payments, and other minor program payments. Whenever calculated prices went below target prices for feed grains, wheat, or cotton, deficiency payments were calculated and added to the basic minimum payment to give total Government payments.[3]

This analysis of yield and export sequences vividly portrays the futility of *forecasting* the future in agriculture. Much more important is the calculated evidence that the U.S. agricultural situation has the potential for widely ranging outcomes, outcomes that to a large extent depend on unpredictable elements influencing supply and demand. Comparing 1976 and 1977 wheat and feed grain projections (app. figs. 2-5) aptly illustrates how 1977 could be either a boom or bust year, depending on the particular circumstances. This is compelling evidence for the policymaker that there is no assurance that either shortages or surpluses loom as an emerging norm.

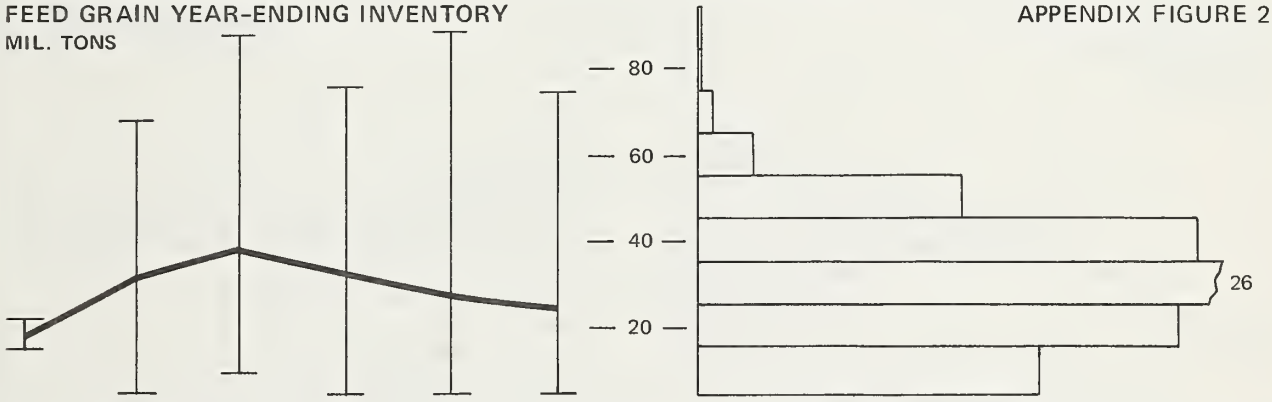
[3]Projections of rice deficiency payments were included for each year as follows: 1976, $143 million; 1977, $138 million; 1978, $126 million; 1979, $86 million; 1980, $28 million; and 1981, $117 million.

CORN PRICES
$/BU.



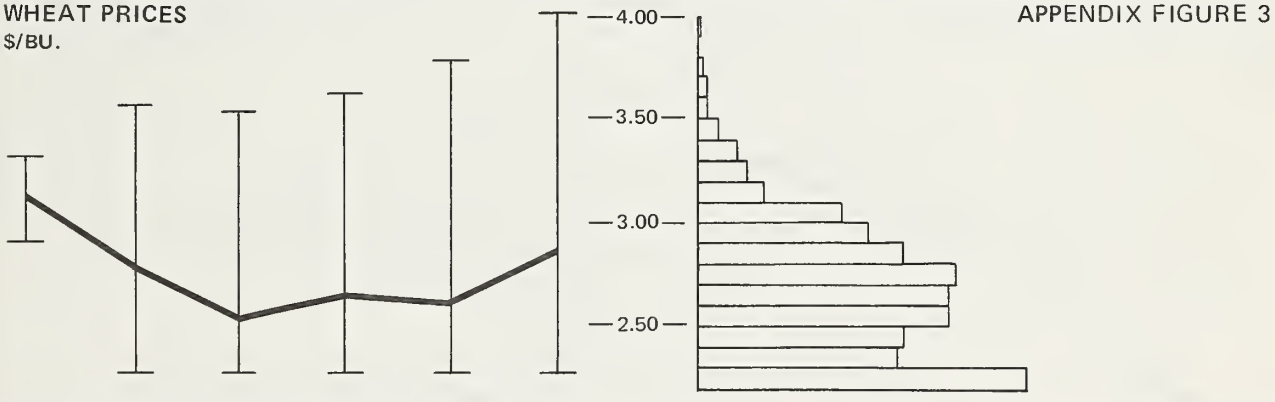
APPENDIX FIGURE 1

FEED GRAIN YEAR-ENDING INVENTORY
MIL. TONS



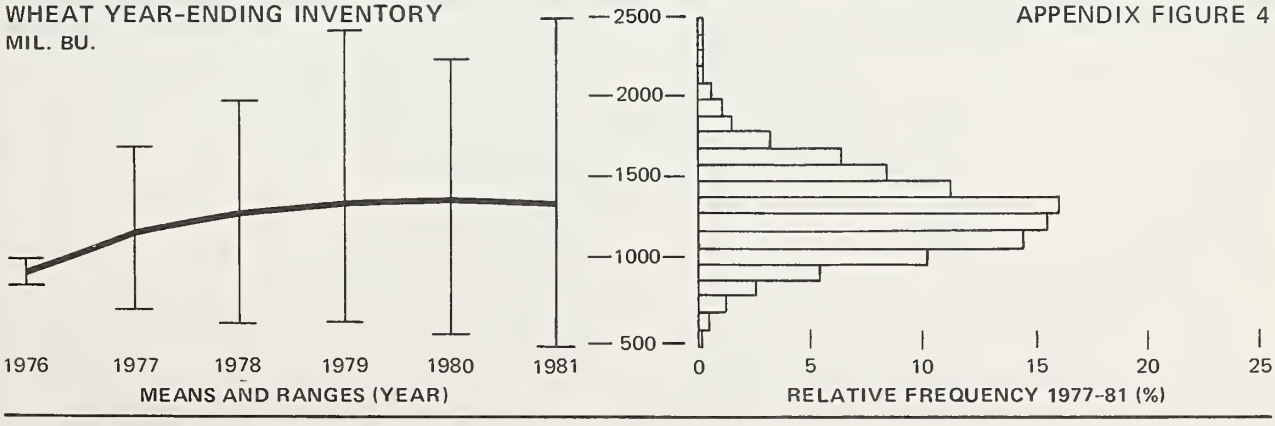
APPENDIX FIGURE 2

WHEAT PRICES
$/BU.



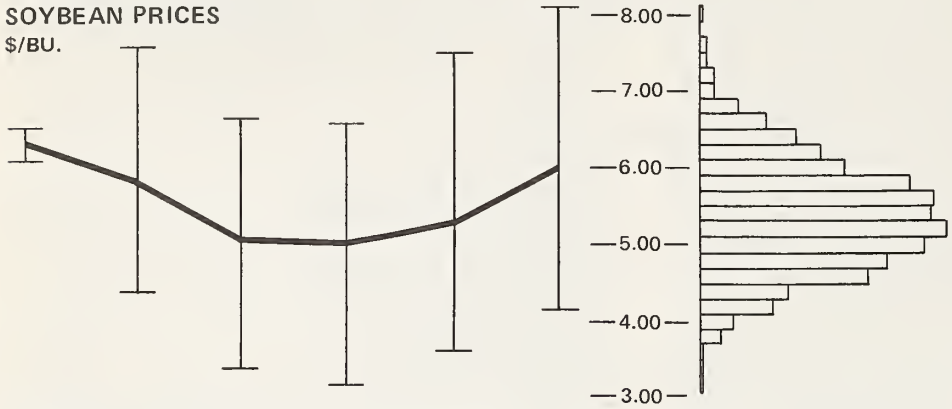
APPENDIX FIGURE 3

WHEAT YEAR-ENDING INVENTORY
MIL. BU.



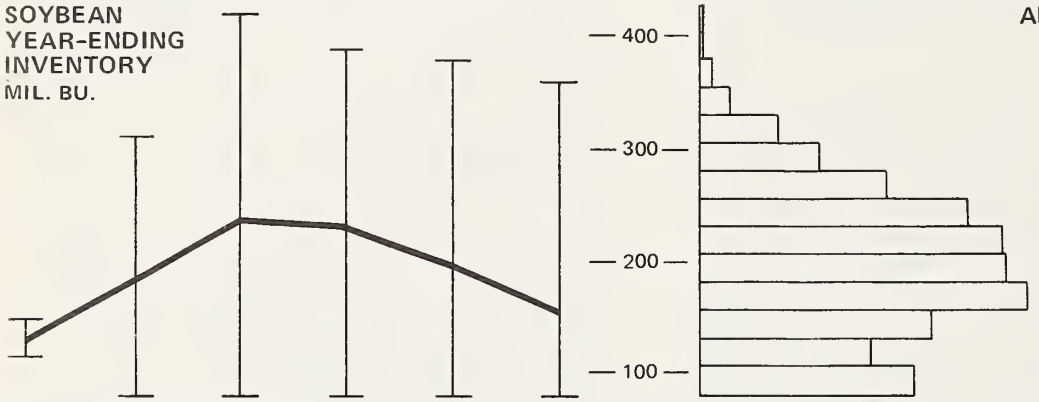
APPENDIX FIGURE 4

SOYBEAN PRICES
$/BU.



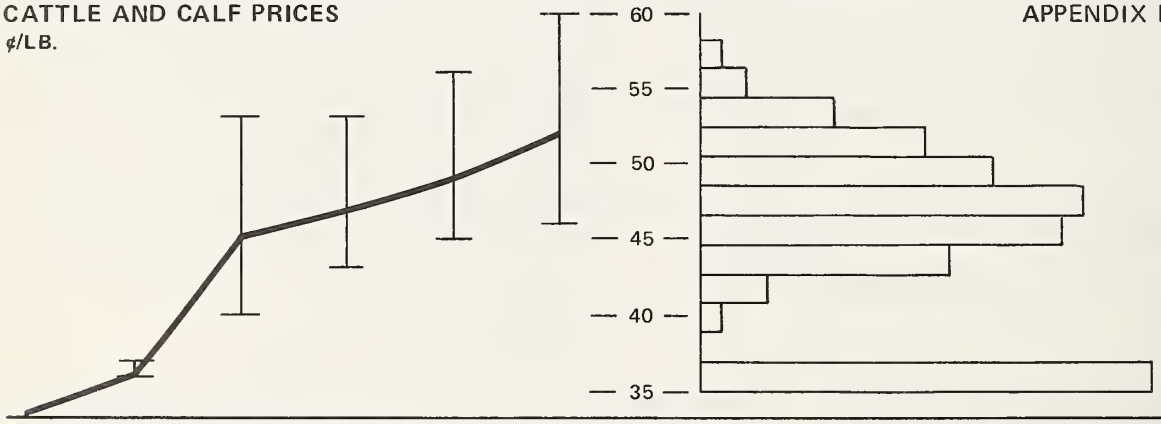
APPENDIX FIGURE 5

SOYBEAN YEAR-ENDING INVENTORY
MIL. BU.



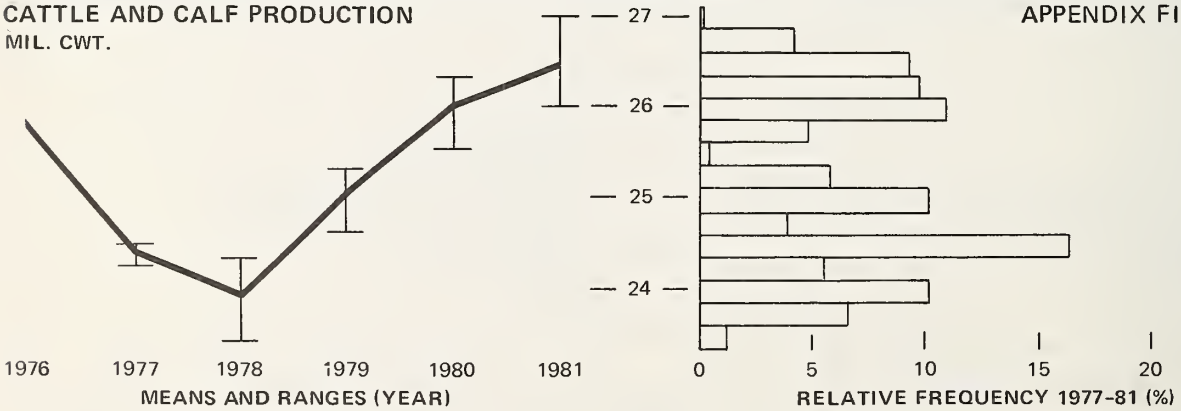
APPENDIX FIGURE 6

CATTLE AND CALF PRICES
¢/LB.



APPENDIX FIGURE 7

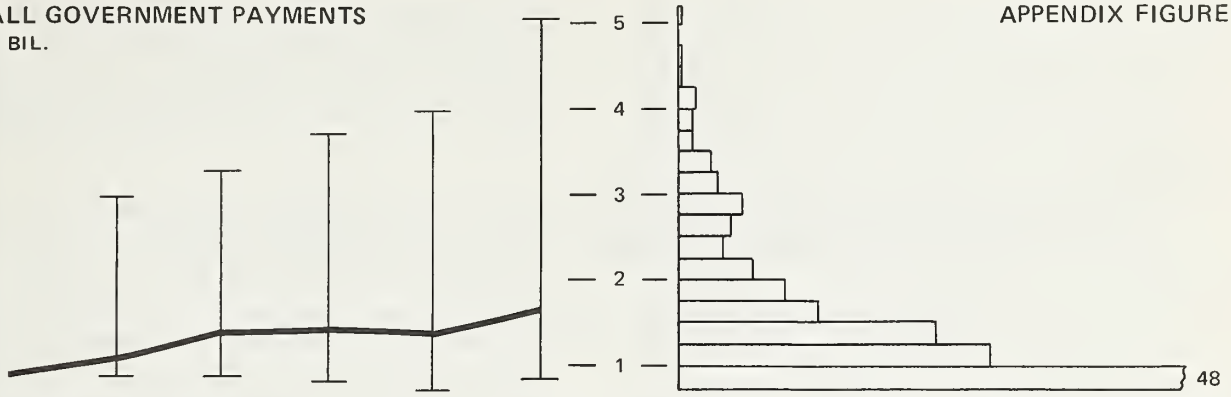
CATTLE AND CALF PRODUCTION
MIL. CWT.



APPENDIX FIGURE 8

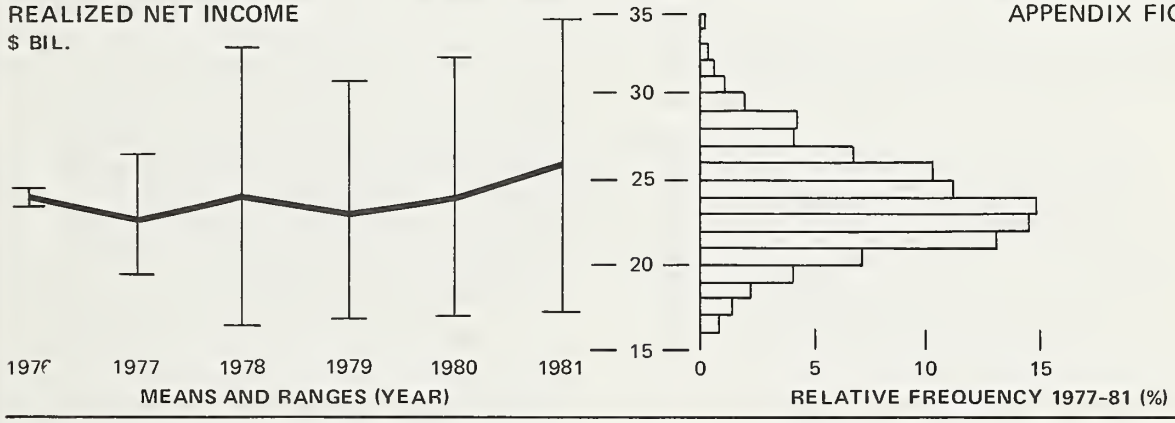
ALL GOVERNMENT PAYMENTS
$ BIL.

APPENDIX FIGURE 9



REALIZED NET INCOME
$ BIL.

APPENDIX FIGURE 10



AN ECONOMIC ASSESSMENT OF THE AGRICULTURE AND CONSUMER PROTECTION ACT OF 1973

By The Agricultural Policy Analysis Program Area Staff *

ABSTRACT

The Agriculture and Consumer Protection Act of 1973, which expires in 1977, has served as a basis for agricultural and food policy since 1974. Provisions of the act apply to crop years 1974-77.

In this article, the authors first review the economic setting before and after passage of the act. This initial section provides context in which the development and operation of the act may be viewed. A key aspect relating to the operation of several provisions is the unprecedented rise in commodity prices and production expenses that occurred shortly after the act was passed. Major provisions of the 1973 act are summarized by section and title, and the impacts are assessed by commodity or program subject area. Treasury expenditures under the act are summarized in tabular form.

KEYWORDS: Agriculture and Consumer Protection Act of 1973, agricultural and food policy and programs, legislation

INTRODUCTION

The Agriculture and Consumer Protection Act, which became law in August 1973, is applicable for crop years 1974-77. To provide a setting in which to assess the act, the economic situation before and after its passage is briefly reviewed. Next, major provisions of the act are summarized, and finally, economic impacts of the operative provisions are assessed.

ECONOMIC SETTING PRIOR TO PASSAGE OF THE ACT [1]

Three major conditions were particularly important in the 3-year period prior to consideration by policymakers of the 1973 act. First, the economy was experiencing continued inflation despite sluggish performance in terms of output and employment. Wage and price controls had been in effect 2 years by the time the act was passed. Second, the feed grain-livestock sectors were still recovering from the lingering effects of a corn crop reduced by the corn blight epidemic and drought of 1970. Third, analysts viewed the "green revolution" as showing signs of success, which had important implications for U.S. exports of agricultural products.

General Economy

Real output grew slowly in the early seventies after declining in the 1969-70 recession. Unemployment reached 5.9 to 6.0 percent in 1971-72, a considerable increase over the 1966-69 annual averages of 3.5 to 3.8 percent and the 1970 average of 4.9 percent.

Inflation did not subside in the early seventies, though it had been expected to do so. A wage-price spiral or cost-push inflation led to the imposition of wage and price controls in August 1971, which were not removed until April 30, 1974. The Consumer Price Index (CPI) rose more than 4 percent in 1971 and 1972, and over 10 percent in 1973. The highly visible food component of the CPI rose rapidly in 1971-73, increasing approximately 4, 4, and 23 percent, respectively. Average hourly earnings in manufacturing grew about 7 percent in 1971-73 (slightly above earlier rates), despite high unemployment.

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[1]This section updates material in Food and Agricultural Policy in 1971-1974: Reflections on Controls and Their Impact. By Glenn L. Nelson. Report prepared for the Off. of Econ. Stabiliz., U.S. Dept. Treasury, Purchase Order 26, Dec. 1974.

The economic situation was further depressed during this period by a rapidly deteriorating balance-of-payments (BOP) position. The BOP (official reserve transactions balance) moved from a surplus of $2.7 billion in 1969 to deficits of $9.8, $29.8, $10.4, and $5.3 billion in 1970-73, respectively.

Agricultural Economy

Domestic corn production in 1970 was reduced 11 percent below the previous year's level because of blight and drought. Substantial existing stocks were drawn upon to offset this reduction but prices still rose 15 percent. Increased production the following year was encouraged by relaxation of set-aside requirements (providing more potential crop acreage). That change, coupled with high yield, led to a record 1971 crop. Though crops in 1972 and 1973 were comparable, stocks further declined almost 60 percent due to increased exports.

The liquidation phase of the hog cycle began in 1971, following the major expansion in hog numbers in 1969 and 1970 that had been encouraged by high net returns. The high corn prices following the reduced 1970 crop reinforced the liquidation. The increased supplies of pork, coupled with the stagnating economy, led to sharply lower hog prices in 1971. Hog numbers declined from their usual cyclical peak through late 1973.

The beef cow herd was expanding rapidly in the early seventies. Feeder cattle prices were trending upward since their lows in 1964-65. The breeding herd was gradually building; heifers were being retained on farms and cows held to older ages, both of which reduced the slaughter level. The beef cow herd had reached an all-time record level of 41 million in 1973. While this expansion offered increased future beef supplies, it served in the short run to reduce beef supplies for consumers.

Production in Developing Countries

The "green revolution" had held promise of circumventing the "world food crisis" which received widespread attention in the midsixties. Efforts to develop and transfer technology to the developing countries were showing positive gains by 1971. New hybrid varieties and improved cultural and management practices seemed to be reflected in the increasing wheat and rice yields for 1969 and 1970 in these countries. From this meager evidence, many people extrapolated production in the developing nations as increasing greatly, possibly exceeding population growth in future years. The implications were for reduced needs for concessional U.S. sales, and possibly intrusion on commercial sales levels.

Ramifications

As noted, several circumstances led to the situation prevailing during formulation of the 1973 act, and these developments conditioned future expectations.

Price increases induced by the corn blight led to a decline in livestock and meat supplies in 1970-71. The record 1971 corn crop depressed corn prices in late 1971 and early 1972, but by mid-1972 the Russian grain purchases boosted prices. Meat prices began rising in late 1972 and early 1973, putting pressure on the food price index during the price control period. Export demand was generally increasing because of a world food output reduced by adverse weather conditions. In mid-1972 the United States held large quantities of wheat and feed grain stocks. The increased demand and resulting price increases during the period of price controls led to a decision to dispose of stocks to hold down domestic food prices. Additionally, production controls were relaxed in 1973 to permit greater output but the action came too late in the year to have maximum effect. Thus, the 1973 act was designed to require few controls—to actually encourage production while including low product floor prices. Subsequent developments kept market prices well above the floor prices.

Chronological Summary

Year	Economic events affecting the U.S. agricultural economy
1970	Corn blight and drought Liquidation phase of hog cycle
1971	Record corn production (Low world production and increasing export demand)
1972	High stock levels of wheat and feed grains First Russian purchases
1972 (late) 1973 (early)	Reduced meat supplies and increasing prices

Category	Wage and Price Controls
Freeze I:	August 15, 1971—November 13, 1971
Phase II:	November 14, 1971—January 10, 1973 CPI increased 2.6 percent, FPI 6.9 percent (annual rates)
Phase III:	January 11, 1973—June 12, 1973 CPI increased 3.7 percent, FPI 8.7 percent (annual rates)
Freeze II:	June 13, 1973—July 18, 1973
Phase IV:	July 19, 1973—April 30, 1974

ECONOMIC SETTING SUBSEQUENT TO PASSAGE TO ACT

Economic conditions in the agricultural sector following passage of the 1973 act were unprecedented. Prices

and production expenses rose to new highs and concerns shifted from the economic well-being of farm sector participants to rising food prices, and, especially, the impacts on low-income consumers. (See table 1 for quarterly summary of CPI components, which shows rapid increases in food prices and the general price level. See table 2 for farm-retail developments.)

Several events occurred in the crops sector during 1973-75 (table 3). Feed grain production was severely reduced in 1974 by adverse weather conditions, resulting in high prices. While the 1975 crop was substantially improved over that in 1974, exports reached 50 million tons. Thus, prices stayed at levels well above the target price and loan rate floors contained in the act. Stock levels, substantially reduced in 1974 to supplement the short crop, reached 1973 levels again in 1975.

Meat prices comprise 51 percent of the food price index. Rising meat prices contributed to the large increase in food prices in 1974 over 1973 (table 4). Farm prices decreased, however, reflecting the slight gain in 1974 beef and pork supplies over 1973 levels. Beef production rose a bit more in 1975 but pork production fell.

The rapid increases in product prices in 1973 outpaced the rise occurring in production costs (except for fuel and fertilizer) (table 5), resulting in record net farm income (table 6). In 1974, product price increases slowed and, together with continued gains in production costs, reduced net farm income from the previous year's level. The 1975 level dropped further from levels reached the previous 2 years because of rising production expenses of nonfarm origin and reduced cash receipts from crops.

Conditions in the agricultural sector since 1973 have differed significantly from previous periods and from expectations when the act was passed. Rapid inflation throughout the economy distorted prices, receipts, and expenditures, pushing them to levels well above those initially included in the 1973 act and also above adjusted levels provided by mechanisms in the act.

Table 1.—Food and all items less food components of CPI, 1973 - second quarter 1976 (1967 = 100)

Product	Quarter				Entire year
	I	II	III	IV	
			1973		
All items less food	127.9	129.7	131.0	133.9	130.7
All food	131.4	138.1	146.2	149.9	141.4
			1974		
All items less food	136.9	141.3	146.1	150.3	143.5
All food	156.8	159.5	162.8	167.9	161.7
			1975		
All items less food	152.9	155.7	158.5	161.3	157.1
All food	171.3	172.5	178.2	179.9	175.5
			1976		
All items less food	163.4	166.0			
All food	179.8	180.0			

Table 2.—Farm-retail developments, 1973-75

Item	1973	1974	1975
		Dollars	
Market basket of farm food:			
Farm value	701	746	784
Farm-retail spread	836	1,004	1,094
Retail cost	1,537	1,750	1,878
Retail food prices:		(1967=100)	
All food	141.4	161.7	175.5
Food away from home	141.4	159.4	174.2
Food at home	141.4	162.4	175.8
Animal-related	150.2	160.0	170.2
Crop-related	132.2	165.0	181.9
Per capita food consumption:			
All food	101.9	102.3	101.2
Animal-related	99.0	101.6	99.4
Crop-related	105.3	103.2	103.3

Table 3.—Major crop developments, crop years 1973/74-1975/76

	Production			Exports		
	1973-74	1974-75	1975-76	1973-74	1974-75	1975-76
	Mil. short tons					
Feed grains	205.0	165.1	204.1	44.4	39.2	49.9
	Mil. bushels					
Corn	5,647	4,651	5,804	1,243	1,149	1,450
Soybeans	1,547	1,233	1,520	539	421	475
Wheat	1,705	1,793	2,138	1,149	1,039	1,350
	Mil. bales					
Cotton	13.0	11.5	8.5	6.1	3.9	3.3
	Ending stocks			Season average farm price		
	1973-74	1974-75	1975-76	1973-74	1974-75	1975-76
	Mil. short tons					
Feed grains	22.2	15.8	23.7			
					Dol./bushel	
Corn	483	359	674	2.55	2.95	2.65
Soybeans	171	186	375	2.25	6.50	4.75
Wheat	247	320	402	3.95	4.04	3.75
	Mil. bales				*Cents/pound*	
Cotton	3.8	5.7	4.0	44.4	41.00	52.00

Table 4.—Major livestock product developments, 1973-75

	Production			Farm prices		
	1973	1974	1975	1973	1974	1975
	Bil. lbs.				*Dol./cwt.*	
Beef[1]	21.1	22.8	23.7	42.8	35.7	33.1
Pork[1]	12.6	13.6	11.2	38.4	34.3	48.0
Broilers[1]	11.2	7.9	8.0	24.0	21.7	26.4
Milk	115.4	115.4	115.3	7.1	8.3	8.7
	Bil. eggs				*Cents/doz.*	
Eggs	66.6	65.9	64.5	52.5	52.8	52.5

[1] Commercial production.

Table 5.—Indexes of prices paid and received for all farm products, 1973 - first quarter 1976 (1910-14 = 100)

Period	Prices paid	Prices received
1973		
I	497	385
II	524	432
III	554	500
IV	548	471
Annual average	531	447
1974		
I	587	511
II	590	447
III	612	478
IV	626	486
Annual average	604	481
1975		
I	638	441
II	666	455
III	677	486
IV	673	471
Annual average	663	463
1976		
I	709	466

[1] Production items, interest, taxes, and wage rates.

Table 6.—Farm income highlights, 1973-75

Item	1973	1974	1975
	Billion dollars		
Cash receipts	86.9	93.5	90.8
Livestock and products	45.8	41.4	43.4
Crops	41.1	52.1	47.4
Production expenses	65.8	73.4	76.0
Farm origin	22.9	22.2	19.8
Nonfarm origin	42.9	51.2	56.2
Realized net farm income	29.5	27.7	23.0

PRINCIPAL PROVISIONS OF THE ACT

Main provisions of the 1973 act appear in table 7.

Table 7.—Summary of principal provisions of the Agriculture and Consumer Protection Act of 1973

Section 1	Summary
Title	
I	*Payment limits.* Establishes $20,000 limit per person.
II	*Dairy.* Sets support price at 80 percent minimum of parity for 1973-74 and 1974-75. May return to 75 percent parity thereafter.
III	*Wool.* Extends incentive payments on wool and mohair at rates of 72 cents/pound for wool, 80.2 cents/pound for mohair.
IV	*Wheat.* Sets (at Secretary of Agriculture's discretion) nonrecourse loans at $1.37/bushel to 100 percent of parity. Repeals wheat certificate program. Sets target price at $2.05 for 1974-75, to be adjusted thereafter. Establishes disaster (natural) provisions based on changes in production expenses and increases in yield.
V	*Feed Grains.* Makes nonrecourse loans available at not less than $1.10/bushel or greater than 90 percent of parity (at Secretary of Agriculture's discretion). May include barley as a feed grain (at Secretary of Agriculture's discretion). Establishes target price for corn at $1.38/bushel for 1974-75 to be adjusted thereafter. Establishes disaster (natural) provisions.
VI	*Cotton.* Sets production goal equal to estimated market offtake plus not less than 5-percent allowance for market expansion (amount announced by November 15). Sets minimum base allotment at 11 million acres. Makes nonrecourse loans available at 90 percent of average world price for U.S. cotton for last 3 years. Establishes disaster (natural) provisions. Establishes target price at 38¢/pound for 1974-75, to be adjusted thereafter.
VII	*Public Law 480.* Extends authorization for long-term dollar credit and foreign currency sales and donations of U.S. farm commodities to developing nations.

Continued

Table 7.—Summary of principal provisions of the Agriculture and Consumer Protection Act of 1973—(cont.)

Section 1	Summary
VIII	*Miscellaneous.* Establishes beekeeper indemnity program. Increases eligibility limits for FmHA applicants. Requires an annual study by U.S. Department of Agriculture (USDA) on cost of producing wheat, feed grains, cotton, and dairy products. Requires USDA to study reasons for losses of livestock in transit. (Authorizes $500,000 in each fiscal year.) Funds wheat and grains research on varietal characteristics at $1 million annually. Requires USDA to provide technical support and information to exporters. Requires weekly reports from exporters on foreign sales of wheat, wheat flour, feed grains, oil seeds, cotton and cotton products, and other commodities (at Secretary of Agriculture's discretion). Authorizes Secretary of Agriculture to establish separate reserve of inventories of not over 75 million bushels of wheat, feed grains, and soybeans or to use reserve to alleviate distress caused by natural disaster. Authorizes Secretary of Agriculture to make grants for firefighting equipment under rural development program ($7 million authorized).
IX	*Rural Environment Conservation Program.* Establishes long-term contracts (3, 5, 10, or 25 years) for Rural Environment Assistance Program and Waterbank Program. Authorizes Secretary of Agriculture to purchase perpetual easements for floodplains, shore lands, and aquatic areas. Authorizes multiyear set-aside contracts to run through for 1977 for establishment of wildlife habitat. Prohibits grazing on such lands. Authorizes cost sharing among States and Federal Government for this purpose. Directs establishment of national and State advisory boards to advise on types of conservation measures needed to effect purposes of Title IX. Authorizes and directs Secretary of Agriculture to encourage development, management, and protection of non-industrial private forest lands. Authorizes cost sharing among States and Federal Government for this purpose. Appropriates $25 million in each fiscal year for this purpose.
Sections 2-4	
II	Repeals Section 301 of Act of August 14, 1964 (P. L. 79-733) which provided for Industry Research Advisory Committee.
III	Amends Food Stamp Act of 1964 to include the following: Makes alcoholic and/or narcotic addicts eligible for food stamps if they are in a rehabilitation program. Changes eligibility rules for certain types of recipients, including persons receiving Social Security benefits. Extends the program nationwide to include all political subdivisions of all States, including Puerto Rico, Guam and the Virgin Islands. Broadens use of food stamps to include imported foods, as well as seeds and plants for use in gardens to produce food, and in Alaska to include purchase of hunting and fishing equipment other than firearms, ammunition, and other explosives. Provides for semiannual adjustment of food stamp issuance levels to account for food price increases. Authorizes Secretary of Agriculture to establish temporary standards for eligibility during an emergency.
IV	Authorizes Secretary of Agriculture to use, until July 1, 1974, funds available under Section 32 of P. L. 320, as amended, to purchase agricultural commodities and products customarily purchased for school lunches, domestic relief distribution, and other domestic food assistance programs. Authorizes use of Commodity Credit Corporation (CC) funds, if CCC stocks are not available, to buy agricultural commodities and products for similar purposes.

Table 8 summarizes U.S. Treasury expenditures under the 1973 act.

ASSESSMENT OF IMPACT OF OPERATIVE PROVISIONS

Areas specified for particular attention in assessment of the provisions of the act are:

(1) Price stability to U.S. farmers.
(2) Long-term and short-term effects of legislation.
(3) Cost to U.S. taxpayers.
(4) U.S. consumer supplies and prices.
(5) World markets.
(6) U.S. farm income.
(7) Effect on competition in world markets.
(8) Potential and extent of assistance to other nations.
(9) Development and maintenance of export markets.
(10) Encouragement of research to improve quantity and quality of crops.
(11) Feasibility of comprehensive rather than piecemeal legislation.

The operative provisions of the act are treated in this section and any impacts on the specified areas are noted where applicable.

Table 8.—Summary of U.S. Treasury expenditures under the Agriculture and Consumer Protection Act of 1973

Provisions	1974	1975 (Estimated)	1976 (Forecast)
	Million dollars		
Dairy:			
Indemnity programs	0.3	NA	NA
Wool	0.1	NA	NA
Wheat:			
Disaster payments	[1] 101.5	[2] 65.0	[3] 97.0
Feed grains:			
Disaster payments	[1] 327.8	[2] 50.0	[3] 196.0
Cotton:			
Disaster payments	[1] 127.8	[2] 75.0	[3] 86.0
Research and Development	10.0	NA	NA
Insect eradication	NA	NA	NA
P.L. 480	[1] 867.0	[2] 1,093.0	[3] 1,500.0
Miscellaneous:			
Beekeeper indemnities	NA	3.3	3.5
Cost of production studies	0.8	0.9	0.9
Food stamp program	NA	[2] 4,708.0	[3] 5,700.0
Food distribution program	NA	NA	NA
Rural Environmental Conservation Program	38.0	NA	NA

Note: Calendar years unless otherwise indicated. NA means not available.

[1] Expended in FY 74. [2] Expended in FY 75. [3] Expended in FY 76.

PAYMENT LIMITATIONS

Because prices of feed grains, wheat, and cotton were well above the target levels in 1974 and 1975, producers could not receive deficiency payments. Therefore the payment limitation provision did not apply to these commodities. However, because of low yields or conditions which prevented some producers from planting part of their crops, some 380,000 producers were eligible for disaster payments in 1974. Of these, about 900 would have been eligible for payments in excess of $20,000 each but their claims were reduced because of the payment limitation.

For 1976 and 1977, target prices will be raised. Target price comparisons appear below:

Crop	*1974 and 1975*	*1976*
Corn (dollars/bushel)	$1.38	$1.57
Wheat (dollars/bushel)	2.05	2.29
Cotton (dollars/pound of lint)	0.38	0.432

If market prices drop below target levels for the periods specified in the act, producers will be eligible for deficiency payments and some large producers may be subject to payment limitations. Any such reduction in their payment would tend to limit Government costs. The provision could have some minimal effect on consumer prices if producers subject to payment limits shift resources from crops subject to payment limits to other crops. These would be crops not eligible for deficiency payments and for which demand was expected to be greater than for the price-supported crops.

DAIRY

The 1973 act extended authorization for Class 1 base plans and clarified authority for seasonal base plans in milk marketing orders. Individual producers (as opposed to cooperatives) received more authority in applying for hearings on milk market orders. The act also raised price supports for milk to 80 percent of parity through March 1975. This increase helped moderate the decline in prices to farmers, although such prices dropped below support level in the spring of 1974. The reductions in consumer prices also were likely smaller in part of this period than they would have been without this provision.

The 1973 act made permanent the suspension of support requirements for butterfat, and it gave the CCC more flexibility in supporting prices of butter to allow for a realignment of support price to market values of butter and nonfat dry milk. If butterfat had been supported at 80 percent of the parity level, the butter support purchase price would have been about 87 cents per pound, compared with the 60-cent purchase price through 1974. But under the provisions of the act, butter prices dropped to the support price in May-July 1974, and market prices remained consistently below 87 cents.

Other provisions of the act, extending authorization for donations to military establishments and Veterans Administration hospitals, had no measurable effect on prices to farmers or consumers. In the dairy indemnity program, producers receive payments if their milk is condemned because it contains an excessive amount of approved pesticides. Extension of this program under the 1973 act transfers about $200,000 per year from taxpayers to milk producers. Extension of the legal status of producer handlers of milk had no economic consequences to producers or consumers.

The Secretary of Agriculture was directed, under the act, to carry out a comprehensive study to determine the effects of imports on the domestic dairy industry and on consumers.

WOOL PROGRAMS

The 1973 act authorizes continuation of the wool and mohair producers' income support program and the wool and mohair promotion program—essentially without change. As the promotion program is financed by deductions from producers' incentive payments, funds for wool promotion were restricted when prices rose above the support level in 1973. Funds have not been available for the mohair promotion program since 1973 because mohair prices have remained above the support level.

WHEAT PROVISIONS

In 1974 and 1975, there were no limitations on wheat production. Prices at the farm level were above both target prices and loan rates (which were set at the lowest level authorized by the 1973 act). As a result, the wheat program did not affect (1) price level or stability, (2) consumer supplies and prices, (3) world markets, or (4) net farm income.

Low yields in some areas resulted in disaster payments of about $101.5 million in 1974 and $51 million in 1975.

COTTON PROVISIONS

In 1974 and 1975, cotton prices were above the loan rate and target prices specified in the 1973 act. There were no restrictions on production of cotton, and some farmers may have planted at least 90 percent of their allotment to cotton in order to protect themselves against risk of a decline in prices they would receive for both cotton and competing crops. This could have increased cotton production by a small amount above what it otherwise would have been, but there is no way to measure this effect.

In general, cotton provisions of the 1973 act had little or no effect on (1) the level and stability of farm prices, (2) consumer prices and supplies, or (3) world markets.

Cotton disaster payments were about the only provision of the act that added to net farm income in 1974 and 1975. These amounted to $127.8 million in 1974 and about $118 million in 1975.

The 1973 act authorized $10 million for cotton research and market development. In addition the Secretary was directed to carry on a program of insect eradication to improve the quality and reduce the cost of producing cotton. It is too soon to estimate the benefits of these efforts.

FEED GRAIN PROVISIONS

Feed grain provisions in the 1973 act had little impact on 1974-75 agricultural production. The following points highlight changes in these provisions and their potential impacts during 1974-75.

1. Exclusion of preliminary price support payments to feed grain producers (provided in the 1970 act) may account for some increase in production costs, in the form of interest payments on borrowed production capital in 1976. No preliminary payments would have been made in 1974 or 1975.

2. Protection from risk was provided through disaster payments for prevented plantings or low yields. In 1974, a poor year for feed grain yields, disaster payments amounted to over $328 million for corn, sorghum, and barley. Expenditures for 1975 were $114 million. Target prices were adjusted in 1976 in accordance with the 1973 act and disaster payments are expected to increase only marginally, if at all.

3. Farm level prices and income stability have not been enhanced by the 1973 act largely because market prices have been significantly above target prices and loan rates.

4. Consumer food prices have been affected little, if at all, by the 1973 act. Farm prices were above support levels and consumer prices are affected more by costs after products leave the farm than by prices received by producers.

5. Farm income has likewise been only marginally affected by the act since deficiency payments for feed grains have not been made and are not expected to be made in the near future. Incomes of feed grain producers were increased by the disaster payments made in 1974 and 1975.

6. Feed grain provisions in the 1973 act have had little direct impact on world markets or world trade because market prices have been far above the loan rates.

Summary: Wheat, Feed Grains, Cotton

In the 1974 crop year, payments for disaster protection for wheat, feed grains, and cotton exceeded $550 million. However, payments in 1975 were only $283 million. With loan rates set at the discretion of the Secretary (within the 1973 act's provisions) and likely to remain significantly below the farm price through the 1977 crop year, little, if any, Government outlays are expected for CCC activities. Deficiency payments will probably not be made through 1976, though their chance of occurring in 1977 will increase if more normal weather conditions prevail permitting higher yields.

In a move toward market orientation (less Government intervention), the act provided for income protection through deficiency payments, in the event prices fall below target price levels; and it provided some risk protection against disasters. However, it also increases the uncertainty for producers who may need short-term financing, by deleting the preliminary price support payment provisions. This deletion likely has had two impacts: (a) some increase in interest costs for producers, and (b) greater uncertainty for bankers who make loans to producers.

P.L. 480 PROVISIONS

The following items highlight changes in the P.L. 480 provisions:

1. North Vietnam was excluded from participation in Title I, Title II, and Title III P.L. 480 shipments, unless these are specifically authorized by the Congress. This provision has had little impact on U.S. exports and balance of payments.

2. The Fair Share Agreement of the United States in Title I agreements was extended. The 1973 act further provided that commercial supplies in the United States are available to meet Title I demands through P.L. 480 programs. These changes have had little if any impact on domestic prices, but would tend to add some support to farm prices.

3. The above provisions have little if any impact on world prices or trade or on U.S. farm or food prices.

4. Recent policies beginning in about 1966 with the Food Aid Act Amendment assure transition from sales

for foreign ("soft") currency to long-term dollar credit. As a result, countries have been meeting their food demand through increased production and decreased reliance on U.S. food aid programs.

OTHER PROVISIONS

Beekeeper Indemnities

Through 1974, $14.6 million had been paid to indemnify losses to beekeepers. Payments were approximately $2.6 million in 1975. It is unknown if the payments have affected farm production or whether they are merely income supplements.

Farmers' Home Administration (FmHA) Loans

The 1973 act changed a farmer's total indebtedness limit from $100,000 to $225,000, with FmHA's portion limited to $100,000. The larger loans permit establishment of more efficient units, which helps reduce costs and increase farmers' incomes. The aggregate effect on production and consumer prices has been negligible.

Cost of Production Study

The Economic Research Service reported results of this study to the Senate Committee on Agriculture and Forestry in December 1975. The report presented national average costs and the cost variability among farms and subregions in which feed grains, wheat, oil crops, and cotton are produced. These estimates will be updated annually, and benchmark surveys conducted every 3 to 5 years. In the interim, other commodities will be surveyed and costs estimated. This effort costs about $1 million a year.

Livestock Study

After studying the livestock loss due to transit, ERS researchers found it to be minimal rather than extensive as had been claimed in the 1973 act.

Wheat and Feed Grains Research

USDA's Agricultural Research Service (ARS) scientists perform research for increasing yields and using fertilizer and herbicides more efficiently. ARS has a continuing program in this area but no additional funding has been appropriated out of the $1 million authorized in the 1973 act.

Technical Support for Importers and Exporters

USDA's Foreign Agricultural Service (FAS) coordinates information useful to importers and exporters of agricultural commodities. FAS analysts work with private traders to evaluate proposals and provide other technical guidance as needed to expand and expedite U.S. agricultural exports.

Export Sales Reporting

Initially, USDA's Statistical Reporting Service collected such data. Since October 1974, FAS has had the responsibility.

Disaster Reserve

The act provided that not more than 75 million bushels of wheat, soybeans, and feed grains could be accumulated to alleviate distress due to natural disasters. Very little grain has been acquired by the Government, since the price supports have been much below market prices.

Encourage Production of Imported Commodities on Set-Aside Land

Because no acreages have been set aside, this provision has been inoperative.

Emergency Supply of Agricultural Products

This provision relates to the actions of the Cost of Living Council (CLC). If CLC price-restricting policies, when operating, resulted in unacceptably low supplies, the Secretary was to notify the President in order to adjust the maximum prices. Since the lifting of price controls, no action has been necessary. Set-aside provisions are not being used and full production has been encouraged to increase supplies.

Rural Environmental Conservation Program

Contracts of 3, 5, 10, and 25 years are provided for environmental conservation purposes as long as they do not interfere with providing adequate quantities of food and fiber at prices fair to producers and consumers. This provision is directed at farms, ranches, wetlands, forests, and other lands. USDA's Soil Conservation Service and Forest Service assist farmers with land use plans. Although the Secretary was authorized to offer multiyear set-aside contracts, none have been used because of the need for full production.

Advisory Committee

This Committee was abolished by the 1973 act.

Food Stamps

The Food Stamp Program first became nationally available under the 1973 Agriculture and Consumer Protection Act. The Program has not since been significantly amended. Food stamps are one of three major consumption assistance programs administered by USDA. About 18 million people participate in the program at a cost of $5.7 billion annually. The Food Stamp Program was extended until the end of 1977 so that it will come up for debate in the next session of the Congress with the other provisions of the 1973 act.

Food Distribution Program

The 1973 act continued commodity dispersal under provisions of Section 32 of P.L. 320. It eliminated dispersals to summer camps that had more than one adult for each five children. The food distribution program has had diminishing significance since the sixties, and the phasing out of this program in favor of food stamps as the vehicle for providing assistance to needy families was completed under the act.

For FY 1976 commodity support for schools totaled $468 million; for needy families about $74 million; for the Elderly Feeding Program, $11 million; and for the Supplemental Food Program, $17 million.

IMPACTS OF REVERTING TO BASIC LEGISLATION WHEN THE AGRICULTURE AND CONSUMER PROTECTION ACT OF 1973 AND RICE PRODUCTION ACT OF 1975 EXPIRE

By
J. B. Penn and W. H. Brown*

ABSTRACT

Provisions in the basic legislation for various commodities (wheat, feed grains, cotton, soybeans, rice, and dairy products) which would be applicable should the Agriculture and Consumer Protection Act of 1973 and the Rice Production Act of 1975 be allowed to expire are identified. Changes are projected for these commodities relating to production, utilization, and farmers' prices, as well as realized net farm income nationally.

KEYWORDS: Agricultural and food policy, commodities, legislation, projections.

PREMISE

The Agriculture and Consumer Protection Act of 1973 and the Rice Production Act of 1975 expire at the end of the 1977 crop year. Should they not be extended or new legislation not be enacted by the Congress, certain of the present provisions and authorized programs will expire. Others will continue but in changed form as specified under statutory authority of so-called permanent or basic legislation.

This article identifies provisions and programs of the 1973 and 1975 laws which expire and those which revert to permanent legislation. For those reverting, the applicable provisions and program specifications are developed and the impacts on the agricultural economy are analyzed for 1978-80.

A projection of likely economic conditions (baseline) is used in the analysis reported here. The baseline projections, prepared for research purposes, are updated frequently as new information on crop and economic conditions becomes available but are not official outlook projections of USDA. While specific projections may have changed since preparation of the analysis, most implications drawn in the report remain valid. Farm income is, of course, directly subject to changes in price estimates.

SUMMARY OF STATUTORY PROVISIONS EFFECTIVE UPON EXPIRATION OF THE 1973 AND 1975 ACTS

The Agriculture and Consumer Protection Act of 1973, approved August 10, 1973, is applicable to the 1974-77 crop years. This act amended or extended sections in the Agricultural Adjustment Act of 1938, as amended, and the Agricultural Act of 1949, as amended, that included sections concerned with acreage adjustment, price support methods, and CCC sales policy. The 1973 act continued authority for the cropland set-aside approach (and acreage diversion) initiated in the Agricultural Act of 1970, substituted acreage allotments for former feed grain base acreages and established a new limit on the amount of payments, if any, a person could receive annually under the programs. The 1973 act ini-

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1974-77 feed grain, upland cotton[1], and wheat crops, with deficiency payments as required. It also made provision for payments if producers are prevented from planting any portion of the farm acreage allotment because of disaster conditions, or if there is crop loss because of disaster conditions. The programs are voluntary.

Additionally, the 1973 act amended or extended sections of the National Wool Act of 1954, the Agricultural Trade Development and Assistance Act of 1954 (P.L. 480), and the Food Stamp Act of 1964.

The Rice Production Act of 1975, enacted February 1976 and applicable to the 1976-77 crops, instituted a program for rice similar to those for feed grain and wheat. However, loans are available only for a quantity of rice equal to the allotted acres times the established yield for the farm, instead of total production as provided for wheat, feed grains, and upland cotton. Also, payments a person may receive under the rice program are limited to $55,000 instead of the $20,000 combined for wheat, feed grains and upland cotton provided under the 1973 act. Target prices and loans as specified in the act are to be adjusted for the change in the Index of Production Items, Interest, Taxes, and Wage Rates from the date of passage of the act to July 31, 1976, for 1976 crop rice; and August through July 1977, for 1977 crop rice. The change may be further adjusted for a change in yields.

If no legislation is enacted to extend or replace the 1973 and 1975 laws, some program authority will revert to existing permanent legislation while other program authority will expire. The status of the individual programs is summarized below and in the following sections.

Program Authority Reverting to Existing Permanent Legislation	Program Authority Expiring
Wheat	Public Law 480
Feed grains	Dairy products:
Upland cotton	Indemnity payments program
Rice	Class I base plan
Wool and mohair	CCC donations to military and VA hospitals
Support price for milk	Beekeepers indemnity program
Cottonseed–soybean support price relationship	Cropland conversion program
CCC minimum sales prices	

[1]Upland cotton is the only type considered in this study, and may be referred to in the text as "upland cotton" or "cotton."

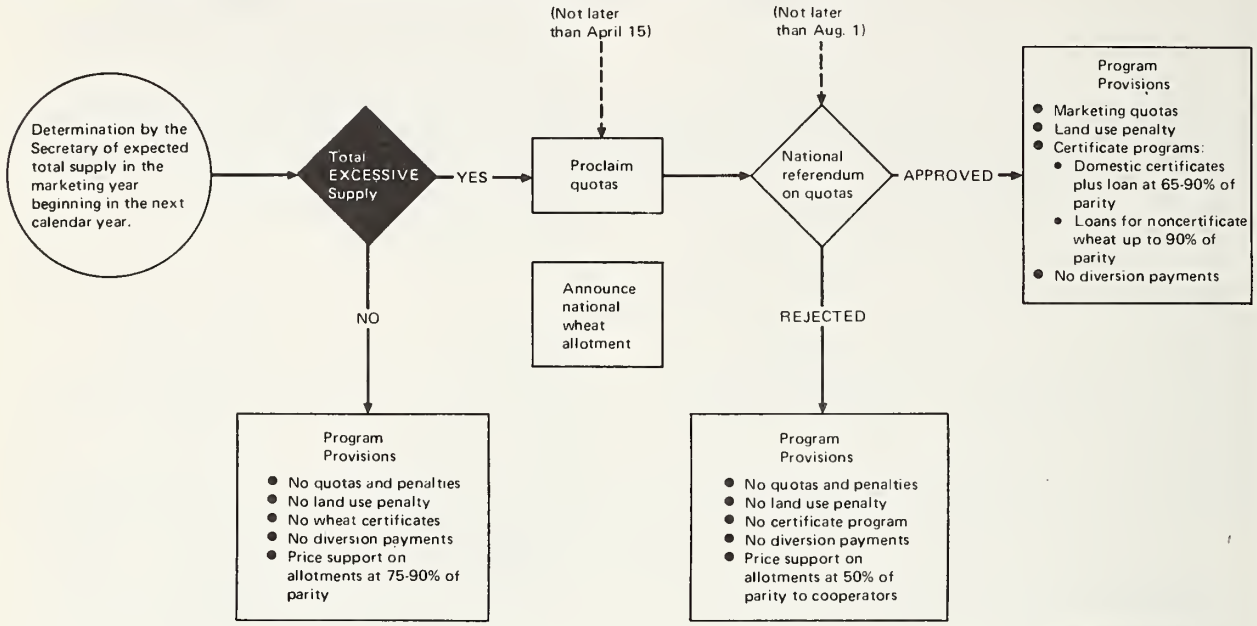
COMMODITY PROGRAMS

WHEAT

Alternative wheat program provisions under basic legislation are summarized below and in figure 1.

1. The Secretary of Agriculture must proclaim whether marketing quotas will be in effect for a crop year by not later than April 15 of the previous year (that is, by April 15, 1977, for the 1978 crop).
   (a) Quotas would be proclaimed if the Secretary determined that, in the absence of quotas, the total supply of wheat in the coming marketing year beginning in the next calendar year would be excessive.
   (b) A national wheat allotment must be announced regardless of whether quotas are proclaimed.
2. If marketing quotas are *not* proclaimed, program provisions are:
   (a) No marketing quotas and no penalties on excess production.
   (b) No land-use penalty.
   (c) No wheat certificates.
   (d) No diversion payments.
   (e) Price support through loans or purchases is at 75 to 90 percent of parity to producers who comply with their allotment.
3. If marketing quotas *are* proclaimed, a national referendum of wheat farmers must be held by not later than August 1 of the year prior to the marketing year to which quotas will apply.
4. If marketing quotas are *approved* by two-thirds or more of the farmers voting in a referendum, program provisions are:
   (a) Marketing quotas are in effect.
   (b) A land-use penalty for failure to make mandatory diversion is applicable. Diversion is mandatory if allotment is less than 59.3 million acres.
   (c) A wheat marketing certificate program is in effect.
      (1) Loan level on wheat accompanied by domestic certificates will not be less than 65 percent or more than 90 percent of parity.
      (2) Loans for noncertificate wheat and wheat accompanied by export certificates are to be set at a level not in excess of 90 percent of parity, considering world market prices and feed value relationship to feed grains.
      (3) Domestic certificate value equals the difference between price support on wheat accompanied by domestic certificates and wheat not accompanied by certificates.
      (4) Variable export certificates are required of exporters with net proceeds payable to cooperators.
      (5) Processors are required to pay full value of domestic certificates.
   (d) No diversion payments.

FIGURE 1
OPTIONS FOR WHEAT PROGRAM UNDER BASIC LEGISLATION



5. If marketing quotas are *disapproved* in referendum, program provisions are:
   (a) No marketing quotas and no penalties for excess production.
   (b) No land-use penalty.
   (c) No wheat certificates.
   (d) No diversion payments.
   (e) Price support through loans and purchases at 50 percent of parity to producers who comply with their allotments.
6. No authority to substitute wheat for feed grains under any of the foregoing alternatives.

FEED GRAINS

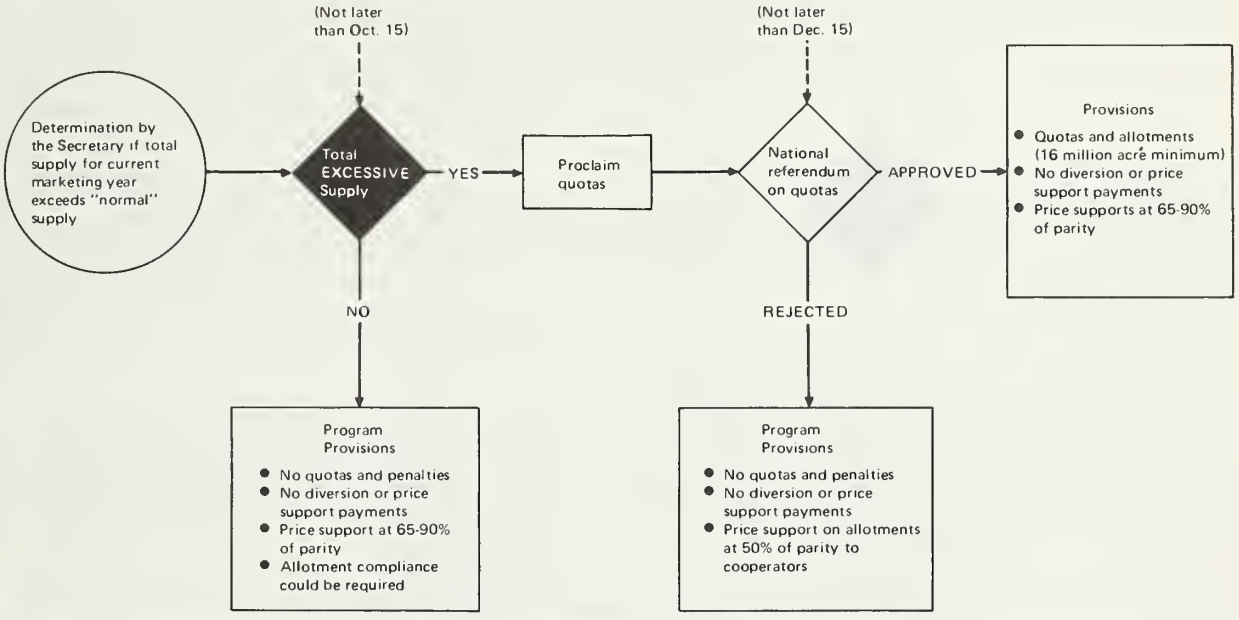
1. No diversion or price support payments.
2. Price support for corn through nonrecourse loans or purchases at a level not less than 50 percent or more than 90 percent of parity as the Secretary determines will not result in increasing Commodity Credit Corporation (CCC) stocks of corn. Other feed grains are supported at a level which is "fair and reasonable" in relation to the level for corn.

UPLAND COTTON

Alternative program provisions for upland cotton are summarized below and in figure 2.

1. The Secretary must proclaim a national marketing quota if he determines that, in the absence of quotas, the total supply would exceed the "normal" supply.
2. If marketing quotas are *not* proclaimed, program provisions are:
   (a) No marketing quotas and no penalties on excess production.
   (b) No diversion or price support payments.
   (c) Price support to cooperators at 65 to 90 percent of parity, as determined by the Secretary, and to noncooperators not to exceed the rate to cooperators. The Secretary can require compliance with allotments for support.
3. If marketing quotas are *proclaimed* and *approved* by two-thirds or more of the farmers voting in a referendum, program provisions are:
   (a) Marketing quotas and acreage allotments (minimum allotment of 16 million acres.)
   (b) No diversion or price support payments.
   (c) Price support to producers who comply with their allotments through loans or purchases at not less than 65 percent or more than 90 percent of parity, as determined by the Secretary.
4. If marketing quotas are *disapproved* in referendum, program provisions are:
   (a) No marketing quotas and no penalties on excess production.
   (b) No diversion or price support payments.
   (c) Price support through loans or purchases to producers who comply with their allotments at 50 percent of parity.
5. No authority to sell, lease, or transfer cotton allotments.

FIGURE 2
OPTIONS FOR UPLAND COTTON PROGRAM UNDER BASIC LEGISLATION



RICE

Alternative program provisions for rice are summarized below and in figure 3.

1. Each year the Secretary is required to announce a national acreage allotment which will produce enough rice, along with the carryin stocks from the preceding crop, to have a supply adequate to meet estimated domestic consumption, exports, and an adequate carryover. The national minimum acreage allotment is 1,652,596 acres.
2. The Secretary must declare marketing quotas if total supply exceeds "normal" supply. The total supply of rice for any marketing year is the carryover of rice for such marketing year, plus the estimated production during the calendar year in which such marketing year begins, and the estimated imports of the commodity during such marketing year. Normal supply of rice is the estimated domestic consumption for the preceding marketing year plus the estimated exports for the marketing year for which the normal supply is being determined, plus a 10-percent allowance for carryover.
3. If marketing quotas are approved by two-thirds or more of the producers, marketing quota penalties will be in effect and rice prices supported by nonrecourse loans at 65 to 90 percent of parity.
4. If marketing quotas are rejected, the price of rice is supported by loans at 50 percent of parity. Producers must plant within allotments to be eligible for loans.
5. If marketing quotas are not declared, price is supported at 65 to 90 percent of parity, but producers must plant within their allotment to be eligible for support. New producers may grow rice but cannot establish an allotment history and are not eligible for support loans.
6. The following provisions of the present program are not included in the basic legislation:
   a. Substitution of crops other than peanuts, tobacco, and extra-long-staple cotton for rice.
   b. Provisions for set-aside and diversion payments.
   c. Research funds for rice.
   d. Target prices and potential deficiency payments.
   e. Disaster payments.
   f. Sale or lease of allotments.
   g. Payment limitation of $55,000 for rice.

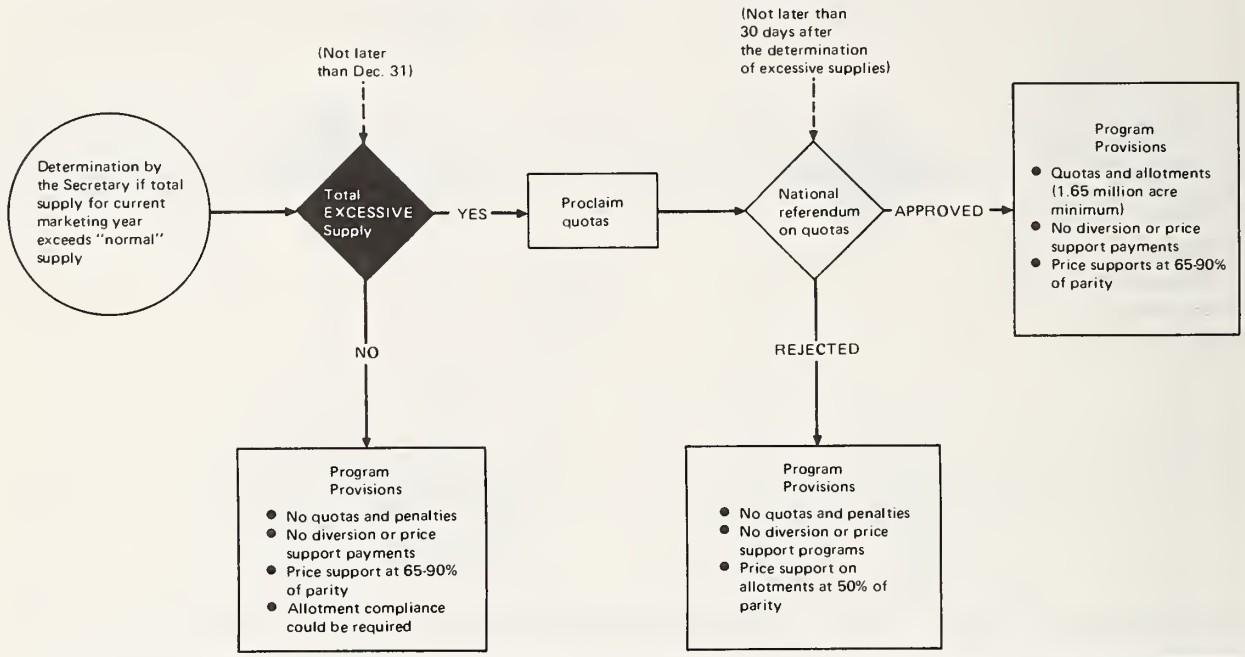
WOOL AND MOHAIR

1. No authority to make price support payments for wool and mohair marketed after December 31, 1977.
2. Price support through loans or purchases discretionary with the Secretary at not more than 90 percent of parity.

DAIRY PRODUCTS

1. Support for milk butterfat was mandatory at 75 to 90 percent of parity under the Agricultural Act of 1949. (The mandatory support on butterfat was temporarily suspended by the 1970 act and permanently repealed by the 1973 act.) The currently applicable provision which became operative after March 31, 1975, is consistent with the basic authority contained in the 1949 act.

FIGURE 3
OPTIONS FOR RICE PROGRAM UNDER BASIC LEGISLATION



2. No indemnity payments to dairy farmers and manufacturers of dairy products after June 30, 1977.
3. No Class I base plans after December 31, 1977, except for Class I base plans issued prior to that date which could continue in effect until December 31, 1980.
4. No authority to donate CCC-owned dairy products to military and VA hospitals after December 31, 1977.

PUBLIC LAW 480

1. No new agreements under Title I and no programs of assistance under Title II after December 31, 1977.

MISCELLANEOUS

1. *CCC Minimum Sales Price*
   (a) After July 31, 1978, the CCC minimum sales price for upland cotton for unrestricted use will be 105 percent of the current loan rate plus carrying charges.
   (b) After the marketing year for the 1977 crops, the CCC minimum sales price for wheat, feed grains, and other commodities will generally be 115 percent of the current loan rate for the commodity plus reasonable carrying charges. If a wheat marketing allocation program is in effect, the current support price is defined as the support price accompanied by a marketing certificate.
   (c) Whenever the Secretary determines that the carryover (at the end of any marketing year) of a price-supported commodity for which a voluntary adjustment program is in effect will be less than 25 percent (35 percent for wheat) of the estimated export and domestic consumption during such marketing year, the CCC may not sell any of its stocks for unrestricted use at less than 115 percent (120 percent for wheat whenever its carryover will be less than 25 percent of such estimated exports and domestic consumption) of the current price support loan plus reasonable carrying charges.
2. *Beekeepers indemnification program*—no program authority after December 31, 1977.
3. *Cropland conversion program*—no authority for new long-term agreements with farmers or States and local agencies ("Greenspan") after December 31, 1977.
4. *Cottonseed-soybean support price relationship*—if prices of either cottonseeds or soybeans are supported, then the Secretary is required to support the price of the other at a level he determines "will cause them to compete on equal terms on the market." (This provision was suspended by the 1973 act.)

IMPACTS ON THE AGRICULTURAL SECTOR OF REVERTING TO PERMANENT LEGISLATION

The programs as provided in the basic legislation are analyzed as to impacts on the major crop and dairy sectors. Where alternative program specifications are possible, contingent upon discretionary action by the Secretary and/or the results of producer referendums, the possible options are examined. As a comparative reference base for the analysis, a projection of a likely economic situation for 1976-80 is used.[2] The baseline situation assumes a continuation of the present legislation through 1980, favorable weather as reflected in trend annual yield increases per acre, continued strength in export sales, and continued strength in the domestic economy. Components of the 1976-80 baseline are shown in appendix tables 1-5 for the major crop commodities analyzed.

[2]This baseline situation for crops was developed in *April 1976* by the Interagency Estimates Committees, USDA, and is revised frequently as new information becomes available. While the baseline estimates have changed since the analysis was completed, the implications drawn in the analysis remain valid.

FEED GRAINS

Projected supply and utilization of feed grains with continuation of the 1973 act (baseline) show a moderate increase in both production and utilization (app. table 1). Ending stocks reach a peak of nearly 40 million tons at the end of the 1977/78 crop year and then decline to 35 million tons by the end of 1980/81 crop year. The farm level price of corn would be from $1.80 to $2.00 per bushel.

Under basic legislation, feed grain prices would be supported at 50 percent of parity. Since projected prices of corn during the 3 crop years following expiration of the present act are about the same as the loan with the basic feed grain legislation (table 1), reversion to this legislation

Table 1—Projected parity and market prices for corn, wheat, cotton, and soybeans, 1978-80

Item	Unit	1978	1979	1980
Corn:				
Parity	Dol./bu.	3.61	3.78	3.96
90% of parity	do.	3.25	3.40	3.56
65% of parity	do.	2.35	2.46	2.57
50% of parity	do.	1.80	1.89	1.98
Market price with present program	do.	1.80	1.85	2.00
Market price as a percent of parity	Pct.	50	49	51
Wheat:				
Parity	Dol./bu.	5.20	5.40	5.60
90% of parity	do.	4.68	4.86	5.04
75% of parity	do.	3.90	4.05	4.20
65% of parity	do.	3.38	3.51	3.64
50% of parity	do.	2.60	2.70	2.80
Market price with present program	do.	2.45	2.35	2.30
Market price as a percent of parity	Pct.	47	44	41
Cotton:[1]				
Soybeans:				
Parity	Dol./bu.	7.73	8.10	8.56
Market price with present program	do.	4.35	4.25	4.60
Market price as a percent of parity	Pct.	56	52	54
Rice:				
Parity	Dol./cwt.	14.37	14.93	15.47
90% of parity	do.	12.93	13.44	13.92
65% of parity	do.	9.34	9.70	10.06
50% of parity	do.	7.18	7.46	7.74
Market price with present program	do.	7.25	8.25	8.75
Market price as a percent of parity	Pct.	50	55	57

[1] Current law pronibits cotton price forecasts by the Government.

would have little influence on production and utilization of feed grains, assuming all loan rates are adjusted proportionally. Any change in feed grain production and utilization would depend upon the response of wheat producers to the change. If wheat producers were to accept quotas, about 7 million acres would be available for other crops. In that case, harvested acreage of feed grain would be increased about 3 million acres per year in 1978-80 (table 2). This would result in increased feed grain production, utilization, and stocks. If prices received should be above loan they would drop to loan level. By 1980 ending stocks could increase by roughly 7 million tons more than would be the case were present programs to continue.

If wheat farmers were to reject quotas and continue wheat production, generally foregoing the chance to put wheat under loan, feed grains would not be affected by reversion to basic legislation. But if wheat farmers were generally to cut back acreage to allotments in order to be eligible for a loan, then feed grains could be affected nearly as much as if wheat quotas had been accepted. In this analysis we have assumed that feed grain production and stocks would have increased half as much with quotas rejected as with quotas accepted. That is, even though wheat quotas were rejected, some farmers would have reduced their acreage to the allotment to be eligible for loan, while other farmers would have planted without consideration of allotment or loan.

Should production be higher and/or demand lower than projected, there could be some stock accumulation and increased Treasury outlays even without any shift from wheat to feed grains. This stock accumulation could be either temporary or long term.

WHEAT

Projections of supply, utilization, and prices through 1980 with the continuation of the present program (app. table 2) indicate: (1) production would be slightly higher than in 1975/76, (2) total disappearance would increase slightly, but would total less than production, (3) supply would increase with ending stocks accumulating to over 1.2 billion bushels at the end of the 1980/81 crop year, and (4) the farm price would decline in 1980/81 to $2.30 per bushel or less than the loan rate, with quotas rejected under basic legislation (50 percent of parity) (table 1).

Unless wheat production were to be less or utilization greater than the indicated projections, expected supply would probably be excessive, and the Secretary would proclaim marketing quotas and allotments. Wheat farmers rejected marketing quotas for the 1964 crop and might reject them again. However, with no quotas, wheat prices are supported at 50 percent of parity. The low-income prospects could induce farmers to accept quotas if the level of support offered with quotas were to be relatively high. The income advantage of accepting quotas cannot be precisely estimated because the support level for both domestic and export wheat is specified as a range. Support for domestic wheat can be set from 65 to 90 percent of parity and for wheat for export from 0 to 90 percent of parity, both at the discretion of the Secretary. The estimates of realized net farm income if farmers accept quotas (shown in table 3) assume that domestic wheat would be supported at 90 percent of parity and nondomestic wheat at 50 percent of parity.

Quotas Rejected

If wheat producers generally were not to expect wheat prices to drop below loan and were to instead plant in response to market price in the previous year, reversion to basic legislation would have little effect on production, utilization, carryover, and price of wheat (table 2). This response would be most likely to occur in 1978 and 1979. But if farmers generally were to expect wheat prices to drop below the loan rate and correspondingly would reduce acreage to the allotment, the effect of reversion to basic legislation would be to reduce production, utilization, and stocks to levels similar to those with quotas in effect. This response would be most likely to occur in 1980 if stocks had been accumulating in previous years.

Assuming a reduction in harvested acreage halfway to the allotment, market price would rise to loan rates and reduce utilization to the level estimated with quotas in effect. Carryover would build slightly more than estimated with present programs. In 1980, ending stocks would amount to 1.2 billion bushels, about the same as with the present program, and 0.2 billion bushels above the estimate with quotas in effect.

Quotas Accepted

With marketing quotas and allotments, a buildup of stocks could be prevented if wheat acreage planted were to be reduced by about 7 million acres below the 72 to 75 million acres per year projected during 1978-80 with current programs continued. Harvested acres would amount to 59.3 million acres (table 2). The law provides for acreage diversion only if the acreage needed to supply projected utilization is less than 59.3 million acres.[3] Since this is not the case, no diversion would be required and acreages of feed grains, soybeans, and cotton could expand, resulting in lower prices received and some buildup in stocks of these crops. If a smaller carryover of wheat were to be desired, the allotment could be set at less than 59.3 million acres. A 10-percent diversion would reduce production nearly 200 million bushels per year.

For the 1980/81 crop year, wheat production would be 160 million bushels below the estimate with continuation of present programs. But utilization would be reduced by 236 million bushels. Ending stocks would be reduced by 219 million bushels.

[3]This is the only provision in the basic legislation for withdrawing land from production for any crop.

Table 2—Projected acreage, production, utilization, stocks, and prices with reversion to basic legislation, 1978-80

Item	Unit	Continuation of present programs			Reversion to basic legislation					
					Wheat quotas rejected			Wheat quotas accepted		
		1978	1979	1980	1978	1979	1980	1978	1979	1980
Harvested acreage:										
Feed grain	Mil. acres	102.7	104.4	104.9	104.4	105.9	106.2	[1] 106.2	[1] 107.4	[1] 107.4
Wheat	do.	68.2	66.4	65.5	63.8	62.8	62.4	[1] 59.3	[1] 59.3	[1] 59.3
Soybeans	do.	54.0	55.0	55.0	54.9	55.8	55.8	55.8	56.5	56.5
Cotton	do.	11.4	10.8	11.2	11.6	11.6	11.6	11.6	11.6	11.6
Production:										
Feed grains	Mil. tons	224.0	231.0	235.7	226.5	233.0	237.8	229.4	235.2	239.5
Wheat	Mil. bu.	2,191	2,172	2,188	2,030	2,035	2,109	1,939	1,981	2,026
Soybeans	do.	1,540	1,580	1,595	1,565	1,604	1,618	1,590	1,624	1,638
Cotton[2]										
Utilization:[3]										
Feed grains	Mil. tons	224.5	232.8	239.3	225.3	233.6	240.1	226.1	234.4	240.9
Wheat	Mil. bu.	2,052	2,107	2,162	2,022	1,986	1,926	2,022	1,986	1,926
Soybeans	do.	1,515	1,550	1,595	1,535	1,570	1,612	1,556	1,586	1,630
Cotton[2]										
Exports:[3]										
Feed grains	Mil. tons	49.8	53.5	56.4	50.3	54.1	56.9	50.8	54.8	57.4
Wheat	Mil. bu.	1,250	1,275	1,300	1,220	1,210	1,153	1,220	1,210	1,153
Soybeans	do.	570	590	610	583	602	622	596	613	632
Cotton[2]										
Ending stocks:										
Feed grains	Mil. tons	39.5	38.0	34.7	40.9	40.3	36.0	43.0	43.8	42.4
Wheat	Mil. bu.	1,132	1,199	1,226	1,001	1,051	1,235	910	906	1,007
Soybeans	do.	205	235	235	210	244	250	214	252	260
Cotton[2]										
Prices received:										
Corn	Dol./bu.	1.80	1.85	2.00	1.75	1.82	1.95	1.70	1.80	1.90
Wheat	do.	2.45	2.35	2.30	2.70	2.70	2.77	[4] 2.80	[4] 2.80	[4] 2.85
Soybeans	do.	4.35	4.25	4.60	4.20	4.10	4.45	4.05	4.00	4.35

[1] Acreage set at this (minimum) level to reduce stocks. [2] Current law prohibits cotton production forecasts by the Government. [3] Domestic use (not shown separately) would be the difference between utilization and exports. Export estimates shown are included in the utilization total. [4] Excludes certificate payments.

Table 3—Net farm income projections under continuation of present programs and return to basic legislation, 1974-80

Year	Continuation of 1973 act	Reversion to basic legislation	
		Wheat quotas rejected	Wheat quotas accepted
	Billion dollars		
1974	27.7		
1975	22.7		
1976	22.0		
1977	22.8		
1978	24.1	24.1	26.0
1979	26.0	26.2	28.6
1980	27.5	27.6	28.2

COTTON

With continuation of present programs, cotton acreages of 11.5 to 12.2 million acres are projected for the 1978-80 crop years (app. table 3). Production would be projected to average only slightly lower than utilization, and carryover would decrease.

With reversion to basic legislation we have assumed that marketing quotas would be declared by the Secretary and accepted by cotton farmers. But if production is less and/or utilization larger than projected, marketing quotas might not be declared. If this happened there would be no restraint on production and loan rates would be 65 to 90 percent of parity. The effect on production and ending stocks would depend largely on farmers' response to a higher support level. If there is a production response to the higher support, there could be a buildup in stocks. But if there is no production response, there would be little effect on production, utilization, stocks, and prices with a return to basic legislation.

If quotas were declared, and accepted by farmers, prices would also be supported at 65 to 90 percent of parity. The law provides for a minimum allotment of 16 million acres. This allotment would be about 4 million acres above the projected planted acreage with present programs.

If the loan were to be set at 65 percent of parity, reduced risk and the relatively high loan rate would tend to encourage cotton production, but limited harvesting equipment and ginning capacity, insect problems, and allotments would tend to hold down production. In some States, such as California, Louisiana, Arizona, and Mississippi, acreage would be reduced substantially below present levels in order to comply with allotments (table 4). Additionally, uncertainty about how long basic legis-

Table 4—Upland cotton acreage harvested in 1974 as a percentage of allotment with return to basic legislation

State	Allotment[1]	Harvested acreage, 1974	Acreage as percentage of allotment
	1,000 acres	*1,000 acres*	*Percent*
Alabama	931	585	63
Arizona	333	392	118
Arkansas	1,340	1,130	84
California	742	1,238	167
Florida	29	12	41
Georgia	810	410	51
Illinois	3	1	33
Kentucky	7	5	71
Louisiana	558	635	114
Mississippi	1,532	1,710	112
Missouri	360	330	92
Nevada	4	2	50
New Mexico	173	140	81
North Carolina	429	145	34
Oklahoma	744	547	74
South Carolina	654	292	45
Tennessee	531	510	96
Texas	6,805	4,400	65
Virginia	15	2	13
Total	16,000	12,484	78

[1] Allotment in 1976 adjusted to 16 million acre national total.

lation would be in effect might tend to discourage investment in harvesting and ginning equipment.

If the acreage planted in 1974 or allotments (whichever is smaller) were assumed to be the limit on cotton acreage, plantings in 1978-80 would be about 12.4 million acres. This acreage would be slightly larger than projected with continuation of present programs. However, the reduction in acreage in certain high-yielding States and the increase in lower yielding States would reduce average yields perhaps 25 pounds per acre. Resulting total production would then be nearly the same or slightly less under basic legislation rather than under present programs. Higher prices would tend to reduce utilization so that carryover would be about the same or lower. On the other hand, if the influence of higher loan rates on acreage and production were to more than offset factors holding down production, there could be a buildup of stocks. If this were to happen, stocks could build up by as much as 2 million bales by 1980.

SOYBEANS

Acreage controls or quotas have never been applicable to soybeans, and the only applicable program has been price support through loan operations. Under basic legislation (Title III, Agricultural Act of 1949), the Secretary is authorized to support the price of soybeans (as a nonbasic commodity) at a level not to exceed 90 percent of parity.

Under present legislation, prices in 1978-80 would be projected to range between $4.25 and $4.60 per bushel (table 1). The present loan rate ($2.50) is well below that and, unless prices were to be supported at a much higher loan level, no direct impact on production, utilization, and prices would be expected from the support program.

If wheat quotas were to be rejected, the impact on production, utilization, and price would be small (table 2). Acceptance of quotas by wheat producers, however, would precipitate a more significant impact. The reduced wheat acreage under quotas would permit expanded soybean acreage and production. Utilization would increase slightly, but by less than the production increase. This would result in increased stocks and lower prices of about 15 cents per bushel than with quotas rejected, and 25 to 30 cent lower prices with quotas accepted over the 3 years.

RICE

With continuation of the present program, projections of supply and utilization indicate that rice production would decrease slightly until 1978 and then increase for 2 or 3 years (app. table 5). Utilization (mostly exports) would increase gradually over the 1978-80 period. Carryover would remain high until the end of the 1977/78 crop year and then return toward normal. Prices received would also increase somewhat after 1977, as the stock level would decline. At the end of the 1977/78 crop year (when the 1975 act expires), carryover would exceed normal by a substantial amount—perhaps 35 million cwt.

With a return to basic legislation, the Secretary would be required to declare marketing quotas and farmers would probably accept them. Allotments would have to be maintained at the legal minimum of 1.65 million acres to hold down carryover. Even with allotment at the minimum, there could be some buildup in carryover. Under basic legislation the loan rate for rice would range from about $9.30 to $10.00 per cwt. The market price probably would be near loan or about 20 percent above projected prices with the present program. There would be support payments. Higher rice prices would have little effect on domestic food use but higher prices together with the elimination of P.L. 480 could reduce exports by more than 50 percent. By 1980 rice utilization could be 35 to 40 percent less than projected with the current programs.

DAIRY

Dairy Price Support Levels

The 1973 act required that manufacturing milk be supported between 80 and 90 percent of parity through March 31, 1975. After that, dairy price supports reverted to the required 75 to 90 percent level provided by the Agricultural Act of 1949, the basic authority for the dairy price support program. Since the current support is governed by the 75 to 90 percent requirement, no additional impact would be expected through 1980.

Price Support Requirement for Butterfat

The 1970 Agricultural Act temporarily suspended the mandatory support on butterfat until March 31, 1974. Subsequently, the 1973 act permanently repealed the price support requirement for butterfat. Therefore, no impact would result from expiration of the 1973 act.

Class I Base, Seasonal Base, and Louisville Plan Authority

There would be no Class I base plans after December 31, 1977, except that Class I base plans issued prior to that date could continue in effect until December 31, 1980. Presently there are Class I base plans operating in only 2 Federal orders. The time period provided to phase out these plans would allow changes to be made without serious impact.

Currently, there are seasonal base plans in 8 Federal order markets and there are Louisville-type plans in 11 Federal markets. It is uncertain whether these provisions would expire with the 1973 act, but presumably they would revert back to the previous general pricing authority.

Authority to Transfer Dairy Products Acquired by the CCC to the Military and to the Veterans Administration

There would be no authority to donate CCC-owned dairy products to military and VA hospitals after June 30, 1977. These used to be important outlets for excess stocks, but CCC stocks of dairy products are now low.

Dairy Indemnity Program

The 1973 act extended the dairy indemnity program until June 30, 1977. After that date no indemnity payments would be made to dairy farmers and manufacturers of dairy products. From their beginning in 1964 through FY 1975, indemnity payments to dairy farmers and dairy plants totaled about $1.9 million. Payments totaled $198,000 in FY 1974 and $193,000 in FY 1975. While relatively small, the payments have been important to many individual farmers.

PUBLIC LAW 480

The major provisions of P.L. 480 are Title I, providing for the sale of agricultural commodities for long term dollar and convertible local currency credit, and Title II, authorizing donations of agricultural commodities for purposes including famine or other urgent or extraordinary relief, malnutrition, development, and so on. Beginning in 1966, the United States undertook a progressive transition of sales for foreign currencies to long-term dollar credits, reflecting a shift from disposal of surplus commodities to commercial sales. By 1972 the transition was completed.

In FY 1975, agricultural exports under P.L. 480 programs totaled $1.1 billion, or 5 percent of total agricultural exports. Seventy percent of this amount was long-term dollar and convertible local currency credit sales and the remainder was donations (there were no sales for foreign currency). Traditionally, wheat was the most important agricultural product under these programs. Other major commodities were feed grains, rice, and oilseeds (P.L. 480 feed grain exports dropped markedly in FY 1975). While over time these programs provided a significant export outlet, the loss of such exports, with the possible exception of rice, would not be expected to have a significant impact on domestic stock levels or commodity prices.

FARM INCOME

With the continuation of present programs, realized net farm income is projected to increase from $24.0 billion in 1978 to $27.5 billion in 1980 (table 3). This compares with $27.7 billion in 1974 and $22.7 billion estimated for 1975. With a return to basic legislation and if wheat farmers were to reject quotas, realized net farm income would be about the same as that expected under current programs. On the other hand, if wheat producers were to accept quotas and domestic wheat were to be supported at 90 percent of parity and nondomestic wheat at 50 percent of parity, realized net farm income in 1978-80 would average about $1.6 billion higher. However, if prices turn out to be higher than projected, income under current programs could be more nearly equal to income with wheat quotas accepted.

GOVERNMENT EXPENDITURES

It is difficult to estimate Government outlays because CCC holdings have been variable with such carryovers as those projected in this analysis. With either assumption about wheat quotas, CCC net outlays could be increased by $1 billion or more per year in 1978-80, and gross outlays would be increased much more. If farmers accepted wheat quotas, outlays for wheat would be less than if they rejected them due to less acreage. But lower outlays for wheat would be offset by higher outlays for feed grains. In addition to CCC outlays, wheat certificate payments would amount to about $1.2 billion per year, with processors required to pay for these certificates.

A complete analysis of all impacts of Government reentry into the market is beyond the scope of this study. It is recognized that numerous implications of such a move exist.

CONSUMER PRICES

Reversion to basic legislation would have little effect on the overall consumer price index. There would be some change in prices paid for a few consumer items, reflecting price changes at the farm level.

CONCLUSIONS

Reversion to basic legislation would involve the following:

- There would be no restrictions on *feed grain* acreage, and prices would be supported by loan rates of 50 to 90 percent of parity for corn and at comparable rates for other feed grains.
- Because of the prospects for higher income, *upland cotton and rice* producers could be expected to accept quotas with prices then supported between 65 and 90 percent of parity through loans or purchases.
- For *wheat*, total supply probably would exceed normal supply and the Secretary of Agriculture would declare marketing quotas and call a producer referendum. Whether quotas were approved by producers would depend upon specific provisions offered in the alternative with quotas. If domestic wheat (that used for domestic food use) were to be supported at the minimum rate of 65 percent of parity and nondomestic wheat at 50 percent of parity, net farm income to wheat producers would likely average slightly higher than with quotas rejected. A higher support level would probably be necessary to get quotas accepted.

Continuation of present programs through 1980 would probably result in projected corn prices of about 50 percent of parity. Upland cotton acreages would be substantially less than the 16 million acre allotment under a quota declaration. An increase in production and utilization of rice could be expected.

With such price levels for feed grains and with quotas for wheat rejected, much of the effect of reversion to basic legislation on acreage, production, and utilization of feed grains would depend on the number of wheat producers who would reduce wheat acreage to be eligible for loan. If a large proportion of wheat producers were to expect prices to be near or above loan and continued to plant more than the allotment, the effect of reverting to basic legislation would be minimal. But if most wheat farmers were to produce within their allotments to be eligible for loan, as much as 6 to 7 million acres could be shifted from wheat to other crops. This shift could reduce the wheat carryover but increase production and carryover of other crops, mainly feed grains and soybeans. In this analysis we assume that wheat acreage is reduced halfway between that acreage estimated with continuation of present programs and that under allotment.

Reversion to basic legislation would affect wheat substantially more than feed grains. With present programs continued, wheat production would exceed utilization and stocks would increase, lowering projected prices from around 50 percent of parity in 1978 to near 40 percent in 1980. Under the basic legislation, if quotas were to be rejected and with wheat supported at 50 percent of parity, there would probably be a small decrease in acreage and production, increase in prices received, and the average carryover in 1978-80 would be less than under continuation of present programs. This assumes that half the producers would plant within their allotment to be eligible for price support even if quotas were rejected. Wheat acreage and production could be limited to avoid stock buildup if quotas were accepted, but this in turn could lead to a buildup in stocks of feed grains, soybeans, and cotton. Stock increases in the latter two commodities, however, would not be serious.

If wheat farmers were to reject quotas and producers generally do not plant within allotment to be eligible for loan, the acreage, production, utilization, and prices of soybeans would not be significantly affected. However, approval of quotas would decrease wheat acreage, permitting some increase in soybean production and utilization but resulting in slightly lower farm level prices.

If crop production were to be greater and/or utilization less than projected, with reversion to basic legislation, prices presently projected to be above loan could decline to the new loan level, with stock accumulations greater than projected, entailing increased Government outlays. Conversely, if production were to be less and/or utilization greater than projected, prices would be substantially above loan with little or no stock buildup.

Reversion to basic rice legislation would result in substantially higher prices, with no support payments and a reduction in utilization, especially exports. Even if allotments are set at the minimum there probably will be a buildup in stocks.

Dairy price support levels for manufacturing milk are currently prescribed within 75 to 90 percent of parity (since March 31, 1975), the same range as specified in the basic legislation. The price support for butterfat was permanently repealed by the 1973 act. There would be no Class I base plans after December 31, 1977, excepting those authorized prior to that date and those could continue through 1980. There are base plans in only two orders. Overall, the impact on the dairy sector of reversion to basic legislation would be minimal.

Farm income would be substantially affected under basic legislation only if wheat quotas were to be accepted and domestic wheat supported at 90 percent of parity. If so, income would average a projected $27.6 billion a year during 1978-80, as compared to $26.0 billion with quotas rejected and $25.8 billion with present programs continued. If prices received with continuation of present programs are higher than projected this difference could be substantially less. However, under basic legislation the net Treasury cost of CCC operations could be increased $1 billion or more annually, because of increased loans and acquisitions.

APPENDIX

Appendix table 1—Feed grains: Acreage, supply, utilization, and prices received, 1974-75 and projections to 1980

Item	Unit	1974	1975	1976	1977	1978	1979	1980
Acreage:								
Planted	Mil. ac.	122.4	123.1	126.6	122.5	122.2	124.0	124.5
Harvested	do.	100.6	104.8	107.0	103.0	102.7	104.4	104.9
Yield harvested acre	Tons	1.84	1.93	2.05	2.14	2.18	2.21	2.35
Supply:								
Beginning stocks	Mil. tons	22.2	15.8	19.5	34.6	39.7	39.5	38.0
Production	do.	165.3	202.4	219.3	220.5	224.0	231.0	235.7
Imports	do.	.5	.5	.3	.3	.3	.3	.3
Total	do.	188.0	218.7	239.1	255.4	264.0	270.8	274.0
Utilization:								
Feed	do.	115.0	129.3	143.4	149.3	154.7	158.8	161.9
Food, seed, industrial	do.	18.0	18.5	19.2	19.5	20.0	20.5	21.0
Total domestic	do.	133.0	147.8	162.6	168.8	174.7	179.3	182.9
Exports	do.	39.2	51.4	41.9	46.9	49.8	53.5	56.4
Total	do.	172.2	199.2	204.5	215.7	224.5	232.8	239.3
Ending stocks	do.	15.8	19.5	34.6	39.7	39.5	38.0	34.7
Prices received:								
Corn	Dol./bu.	3.02	2.45	2.00	1.75	1.80	1.85	2.00
Grain sorghum	do.	2.78	2.30	1.85	1.60	1.65	1.70	1.85
Barley	do.	2.79	2.50	1.90	1.65	1.70	1.70	1.80

Appendix table 2—Wheat: Acreage, supply, utilization, and prices received 1974-75 and projections to 1980

Item	Unit	1974	1975	1976	1977	1978	1979	1980
Acreage:								
Planted	Mil. acres	71.35	75.10	78.4	77.5	75.0	73.0	72.0
Harvested	do.	65.61	69.66	68.6	70.5	68.2	66.4	65.5
Yield/acre	Bu.	27.4	30.6	29.2	31.7	32.1	32.7	33.4
Supply:								
Beginning stocks	Mil. bu.	247.0	327.0	552.0	754.0	992.0	1,132.0	1,199.0
Production	do.	1,796.0	2,134.0	2,000.0	2,236.0	2,191.0	2,172.0	2,188.0
Imports	do.	2.0	2.0	2.0	1.0	1.0	1.0	1.0
Total	do.	2,045.0	2,463.0	2,554.0	2,991.0	3,184.0	3,305.0	3,388.0
Utilization:								
Food	do.	525.0	535.0	536.0	537.0	538.0	539.0	540.0
Feed residual	do.	66.0	85.0	125.0	150.0	180.0	210.0	240.0
Seed	do.	88.0	91.0	89.0	86.0	84.0	83.0	82.0
Total domestic	do.	679.0	711.0	750.0	773.0	802.0	832.0	862.0
Exports	do.	1,039.0	1,200.0	1,050.0	1,225.0	1,250.0	1,275.0	1,300.0
Total disappearance	do.	1,718.0	1,911.0	1,800.0	1,998.0	2,052.0	2,107.0	2,162.0
Ending stocks	do.	327.0	552.0	754.0	992.0	1,132.0	1,199.0	1,226.0
Prices received	Dol./bu.		3.60	3.25	2.90	2.45	2.35	2.30

Appendix table 3—Upland cotton: Acreage, supply, utilization, and prices received, 1974-75 and projections to 1980

Item[1]	Unit	1974	1975	1976	1977	1978	1979	1980
Acreage:								
Planted	Mil. ac.	13.62	9.62	11.20	12.50	12.20	11.50	12.00
Harvested	do.	12.48	8.99					
Yield/acre	Lbs.	440	441					
Prices received[1] .	Dol./lb.	.427	.500					

[1] Current law prohibits forecasts of cotton production and price by the Government.

Appendix table 4--Soybeans: Acreage, supply, utilization, and prices received 1974-75 and projections to 1980

Item	Unit	1974	1975	1976	1977	1978	1979	1980
Acreage:								
Planted	Mil. ac.	53.5	54.6	49.3	53.0	55.0	56.0	56.0
Harvested	do.	52.4	53.6	48.3	52.0	54.0	55.0	55.0
Yield/acre	Bu.	23.20	28.40	28.00	28.25	28.50	28.75	29.0
Supply:								
Beginning stocks	Mil. bu.	171	185	280	190	180	205	235
Production ...	do.	1,215	1,521	1,350	1,470	1,540	1,580	1,595
Total supply ..	do.	1,386	1,706	1,630	1,660	1,720	1,785	1,830
Utilization:								
Domestic	do.	780	901	905	930	945	960	985
Exports	do.	421	525	535	550	570	590	610
Total	do.	1,201	1,426	1,440	1,480	1,515	1,550	1,595
Ending stocks ...	do.	185	280	190	180	205	235	235
Prices received ..	Dol./bu.	6.64	4.63	4.75	4.35	4.35	4.25	4.60

Appendix table 5—Rice: Acreage, supply, utilization, and prices received, 1974-75 and projections to 1980

Item	Unit	1974	1975	1976	1977	1978	1979	1980
Acreage:								
Planted	Mil. ac.	2,555	2,818	2,361	2,300	2,200	2,200	2,500
Harvested	do.	2,536	2,802	2,340	2,280	2,180	2,180	2,480
Yield/acre	Lbs.	4,432	4,555	4,640	4,690	4,730	4,770	4,650
Supply:								
Beginning stocks	Mil. cwt.	7.8	7.1	34.2	42.7	44.6	35.7	20.7
Production ...	do.	112.4	127.6	108.6	106.9	103.1	104.0	115.0
Total supply ..	do.	120.3	134.7	142.8	149.6	147.7	139.7	135.7
Utilization:								
Domestic	do.	40.3	41.8	43.5	44.0	45.0	46.0	47.0
Exports	do.	69.5	58.7	56.6	61.0	67.0	73.0	77.0
Total	do.	109.8	100.5	100.1	105.0	112.0	119.0	121.0
Ending stocks ...	do.	7.1	34.7	42.7	44.6	35.7	20.7	11.7
Prices received ..	Dol./cwt.	11.20	7.93	7.00	7.00	7.25	8.25	8.75

THE CONCEPT AND USE OF PARITY IN AGRICULTURAL PRICE AND INCOME POLICY

By Forrest Holland*

ABSTRACT

The historical development of the concept of agricultural parity is reviewed, its components discussed, and the economics of its use analyzed. Parity price formulas are shown, and the relative importance of commodities in the Index of Prices Paid and Index of Prices Received is detailed. Also discussed are the parity ratio as a measure of purchasing power, its shortcomings in accounting for technological change, and other problems related to the rise and use of the parity concept.

KEYWORDS: Parity price, parity ratio, agricultural price and income policy.

THE DEVELOPMENT OF AGRICULTURAL PARITY

The origin of the concept of parity for agriculture may be traced to the agricultural depression of 1920-22. The sudden drop in prices during those years followed two decades of agricultural prosperity including the "Golden Era" of 1900-1914. Total value of farm production fell 32 percent in 1920-21 because of depressed commodity prices. Cattle prices declined 50 percent, cotton prices dropped 60 percent, and grain prices also moved downward (*2*, p. 4).[1] Many of the Nation's farmers faced bankruptcy when bank notes for land and equipment came due, as commodity receipts failed even to cover direct cost of production. But the economy's industrial sectors (except farm machinery) were relatively well-off during this period. This disparity led farm groups to demand parity (economic equality) for agriculture and to condemn industrialization at the expense of agriculture.

EARLY LEGISLATION TO EQUALIZE PRICES

During the twenties, farm groups campaigned diligently for economic parity of agriculture with industry. Led by George N. Peek (who later became the first administrator of the Agricultural Adjustment Act of 1933), farm groups lobbied the Congress for legislation to ease their plight. Although considerable disagreement occurred among the agricultural groups as to the type of legislation desired, most farm groups supported the McNary-Haugen bill.

The McNary-Haugen bill provided for flexible tariffs, ratio-prices, and export handling by a government corporation. Domestic prices would be held above world prices through tariffs, and all excess production would be dumped on the world market. Funding for the export operation was to come from an equalization tax to be paid by farmers. A major weakness of the McNary-Haugen plan was that it provided no production controls (Peek energetically opposed controls) yet it called for artificially maintained high prices. The bill, introduced several times, either failed to pass in the Congress or was vetoed.

In the mid-twenties, several minor agricultural proposals were passed by the Congress and signed by Presi-

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[1]Italicized numbers in parentheses refer to items in References at the end of this article.

dent Coolidge. For the most part these bills reflected Coolidge's contention that the agricultural cooperatives could handle agricultural problems through marketing and voluntary production control. To a large extent these measures were an unsuccessful attempt to appease the McNary-Haugen supporters. (The principal features of the McNary-Haugen bills later became part of the New Deal legislation of the 1930's.)

The Agricultural Marketing Act of 1929 was essentially ineffective. It provided for marketing through cooperatives but contained no production controls. Designed to support agricultural commodity prices, the act went into effect at the beginning of the Depression and all allocated funds were exhausted by payments connected with the 1930 crop. No further support operations were undertaken.

The Agricultural Adjustment Act of 1933 provided the legal basis for Government price support operations based on the concept of parity. This legislation charged the Secretary of Agriculture to maintain the "purchasing power" of the farm sector relative to a specified base period. The act did not explicitly prescribe how this maintenance would be achieved, thus giving the Secretary broad discretionary authority. The base period specified for most commodities was August 1910 to July 1914 (*8*, p. 36). This period was chosen because farm and nonfarm prices were reasonably well balanced (*17*, p. 2; and *15*, p. 36), prices were relatively stable, and there was no comparable post-World War I period (*16*, p. 13). The Index of Prices Paid, first published in 1928 by USDA's Bureau of Agricultural Economics, became the vehicle through which farm purchasing power was to be measured (*16*, p. 13).

The 1933 Agricultural Adjustment Act did not contain the word "parity." But the concept of purchasing power relative to a base period, in conjunction with the required use of the Index of Prices Paid, is clearly a reference to parity prices (*3*, p. 693). The act also provided for acreage controls, with benefits to be paid participating producers; market regulation through voluntary agreements with producers, processors, and other handlers; and processor taxes to subsidize exports. The key components of the bill were the requirement for maintenance of purchasing power and the authority granted to the Secretary of Agriculture.

The Agricultural Adjustment Act of 1933, especially the sections providing for voluntary marketing agreements, received much criticism. The legality was questioned (*1*, p. 370), which became a major impetus for the Agricultural Act of 1935, the Soil Conservation and Domestic Allotment Act of 1936, and the Agricultural Marketing Act of 1937. The 1935 act was an attempt to strengthen the marketing agreement provision of the 1933 Agricultural Adjustment Act. In addition to the marketing provisions, the 1935 Agricultural Act added interest payments on farm mortgages and tax payments on farm real estate as components of the Prices Paid Index (*16*, pp. 38-39 and *8*, p. 36). The Agricultural Adjustment Program was terminated in January 1936, when the Supreme Court invalidated the production control provisions of the 1933 act. The Soil Conservation and Domestic Allotment Act of 1936 was then passed to fill the void in legislation before spring planting.

By 1937, Congress was prepared to clarify the legal status of marketing agreements and orders. The Agricultural Marketing Agreement Act of 1937 was primarily a response to the 1936 Supreme Court decision which declared illegal the acreage-production controls and processing tax portions of the Agricultural Adjustment Act of 1933 (*16*, p. 39). The 1937 act directed the Secretary of Agriculture to do the following:

> Establish and maintain such orderly marketing conditions for commodities in interstate commerce as will establish prices to farmers at a level that will give agricultural commodities a purchasing power with respect to articles which farmers buy, equivalent to the purchasing power of agricultural commodities in the base period.

THE PARITY CONCEPT EMERGES

The next major piece of agricultural legislation was the Agricultural Adjustment Act of 1938, the first act to specifically mention "parity." Parity price was defined as the price giving "equivalent purchasing power;" and the method of computing a parity price—later called the "old formula"—was specified.[2] The 1938 act also defined a parity income, but this concept was never used in an agricultural program (*5*, p. 14; *17*, p. 14).

The major subsequent post-war acts were the Agricultural Acts of 1948 and 1949, which, along with the acts of 1952, 1954 and 1956, comprise the legal basis for the current parity ratio and parity price computations.[3] The 1948 and 1949 acts provided for the so-called "new formula" in computing parity prices.[4] The 1948 act included a transitional parity price defined so that a decrease in parity price that occurred by going from "old formula" to "new formula" could not exceed a specified percentage. The 1949 act specified that the parity price for basic commodities (corn, cotton, wheat, peanuts, rice, and tobacco) during 1950-53 would be greater than or equal to the old-formula parity price. The requirement that parity prices for basic commodities be the greater of "old" and "new" parity prices was extended through calendar year 1955 by

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[2]The "old formula" parity price was computed as follows: (average price received during base period) x (current Index of Prices Paid) = parity price. The index equals 100 for the base period (*5*, p. 12).

[3]The parity ratio is defined as: $\frac{\text{Index of Prices Received}}{\text{Index of Prices Paid}}$

[4]The "new formula" parity price is based on the most recent 10-year average of prices received for the commodity, and on the Index of Prices Received. Computational details are explained later in this article in the section "The Parity Ratio and the Parity Price."

the Agricultural Act of 1952. The special requirement for basic commodities expired December 31, 1955. Also, by January 1960, all parity prices were to be determined by the "new formula" (*14*, pp. 6-9).

Legislated agricultural policy in the last two decades has been rooted in the Agricultural Adjustment Act of 1933 and subsequent legislation, including legislation amending the previous acts. Current agricultural legislation, the Agriculture and Consumer Protection Act of 1973, applies to the 1974-77 crop years. Upon its expiration, new legislation will be necessary or the previous bills as unamended ("basic legislation") become effective (see the article by Penn and Brown in this *Review* for a discussion of reversion to basic legislation).

MAJOR INDICES

The two components which make up the currently used parity ratio are the Index of Prices Received and the Index of Prices Paid (the latter known as the Parity Index). The Agricultural Adjustment Act of 1933 requires that the USDA maintain both the Parity Index and Index of Prices Received with a base period of 1910-1914. The first Index of Prices Paid was published by the former Bureau of Agricultural Economics (BAE) in 1928 (*16*, p. 13). This index was based on price data the BAE had collected since 1910. The weights assigned to various items farmers purchase were based on cost-of-living and farm management surveys conducted from 1920 to 1925 (*7*, p. 34). The current Parity Index is similarly constructed, and the weights are periodically updated from new survey data.[5] The number of commodities included in the survey and, thus, the index, has increased dramatically, from 142 in the first survey to over 300 in the most recent. The commodity groups and weights are shown in table 1.[6]

One of the most difficult tasks in construction of the index is the inclusion of all goods and services farmers purchase. For this reason, prices are measured for an average, or most common, item; conceptually, they reflect the purchases of an average U.S. farmer. Several major items are not specifically included because price data are unavailable. These include day-to-day living expenses, such as medical care, recreation, gifts and contributions, and personal insurance (*7*, p. 36). Similarly, production factors, such as custom work, machinery hiring, crop insurance, cash rent, and marketing expenses, are not included as separate items in the production component. Items which are not specifically measured (those noted

[5]Survey data for 1971-73 were used in the recent revision, when new weights and revised indices were released by USDA's Statistical Reporting Service in May 1976 (*15*).

[6]See (*17*) for a detailed discussion of the commodity groups.

Table 1.—Group weights: Indexes of prices paid by farmers including interest, taxes, and wage rates

1955 weight base period[1]		1971-73 weight base period[2]	
Family living	39.50	Family living	30.4
Food and tobacco	13.40	Food	6.4
Clothing	6.34	Clothing	2.2
House furnishings	3.99	Housing	7.8
Household operations	5.77	Autos and auto supplies	5.2
Building materials, house	4.37	Medical and health care	2.1
Autos and auto supplies	5.63	Education, recreation, and other	6.7
Production	50.90	Production	57.6
Feed	12.80	Feed	11.8
Feeder livestock	4.60	Feeder livestock	11.7
Seed	2.55	Seed	1.8
Fertilizer	4.11	Fertilizer	4.2
Equipment and supplies	3.66	Agricultural chemicals	1.7
Motor supplies	8.39	Fuels and energy	3.5
Motor vehicles	4.38	Farm and motor supplies	2.2
Farm machinery	5.21	Autos and trucks	2.5
Building and fencing materials	5.20	Tractors and self-propelled machinery	4.5
		Other machinery	2.7
		Building and fencing	3.6
		Farm services and cash rent	7.4
Prices paid, total commodities	90.40	Prices paid, total commodities	88.0
Interest	.96	Interest	4.0
Taxes	2.04	Taxes	2.8
Wage rates	6.60	Wage rates	5.2
Commodities, interest, taxes, and wage rates	100.00	Commodities, interest, taxes, and wage rates	100.00

[1] Weights used September 1952 through December 1964. [2] Weights used currently and for revisions starting January 1965.

Source: (*15*).

above as well as some others) are accounted for in the index by spreading estimates of their costs over other items in the same category.[7]

The prices used to compute the Index of Prices Paid are average prices. As such, the price for a particular item, sugar, for example, conceptually reflects all grades and classes of sugar used by farmers. Because of the immense data collection problems, the price used is that reported by sellers for the type of sugar which is the volume leader, or "most commonly bought by farmers" (*16*, p. 14). Price data are collected from several sources. Items included in the family living group come from chain stores and other retailers. Some production-related prices are obtained from farmers, and others are supplied by the Economic Research Service (ERS) and the Statistical Reporting Service (SRS).[8]

THE INDEX OF PRICES RECEIVED

The Index of Prices Received resembles the Parity Index in the sense that prices used in its composition are averages. Thus, the price used for wheat, for instance, refers to an average for wheat encompassing all grades and classes. The price levels represented by the index are a composite U.S. average; in essence, the index reflects a general average price level for U.S. agricultural products relative to the base period. Like the Prices Paid Index, the Prices Received Index refers to an average U.S. farmer.

The first Prices Received Index was the 10-commodity (no livestock) index published in the March 1909 issue of the *Crop Reporter* (*7*, p. 34). Later on, the *Monthly Crop Report* contained the index; and livestock was added before 1920. The original index used weights based on 1866-1907 price-quantity data (*8*, p. 34). Since its origin, the index has periodically been updated to include additional commodities and more current weights.

The current index of 56 commodities contains weights based on cash receipts during 1971-73 (table 2). SRS maintains the index, and SRS analysts collect the necessary price and quantity data to compute it monthly.[9] In total, the commodities included account for about 95 percent of the total value of U.S. agricultural production (*16*, p. 4). The remaining 5 percent includes forestry, nursery, and greenhouse products; fruits and nuts; and sugarbeets (*8*, p. 75).

THE PARITY RATIO AND THE PARITY PRICE

THE PARITY RATIO

The parity ratio measures the average purchasing power of a farmer's products over time. The prices of agricultural commodities are compared with the prices of commodities purchased by farmers relative to a base period (1910-1914 for legal purposes). For instance, a parity ratio of 100 (actually 1.0, but indexed to 100) means that today's agricultural products represent as much purchasing power as they did in the base period, given that all products, technology, and other factors are unchanged relative to the base period. If the ratio is greater than 100, farm products have greater purchasing power than they did in 1910-1914; if the ratio is less than 100, farm products have less purchasing power. The parity ratio is obtained by dividing the Index of Prices Received by the Index of Prices Paid (Parity Index). Note that the parity ratio is strictly a price measure. It does not reflect relative income, standard of living, or production costs since quantities are not included (*16*, p. 20). The parity ratio also does not directly reflect income from price support operations (although some program effects enter implicitly through market prices); thus, USDA has developed an adjusted parity ratio. This ratio differs from the parity ratio in that Government transfers to the agricultural sector are included by adjustment of the Prices Received Index before the ratio is computed.[10] In periods of significant direct Government payments to producers, the adjusted parity ratio indicates farm purchasing power more accurately than does the parity ratio. For example, in September 1969, the parity ratio was 74, while the adjusted parity ratio was 79 (*16*, p. 22). When there are no Government transfers to producers, the two ratios are identical.

THE PARITY PRICE

The parity price is defined as that price which gives the particular commodity the same purchasing power that it had during the 1910-1914 base. Under the "new formula" method, parity price would be calculated as follows (*17*, p. 8):[11]

[7]Recent proposals have suggested inclusion of these items. In the production group, a new category called "Farm Services and Rent" was proposed (*10*, p. 32). In the living expenses group, use of the Bureau of Labor Statistics Consumer Price Index (CPI) subgroup of Health and Recreation was suggested to cover medical care and recreation (*12*, p. 24). Both of the proposed changes became effective with the recent revisions based on the 1971-73 ERS surveys.

[8]For a more detailed discussion of data procurement and data problems see (*16*, *7*, *17*).

[9]See (*16*, *17*, *7*) for details of data collection.

[10]The adjustment is made by dividing Government payments by market receipts, adding 1.0 to the result, and multiplying the sum by the Index of Prices Received. For example, suppose the ratio is 0.10. The Prices Received Index is multiplied by 1.10, and the parity price is then obtained as shown above.

[11]For a discussion of "old" and "new" parity price see (*16*, *17*, *5*, *7*).

Table 2.—Relative importance of commodities in indexes of prices received by farmers, base weight periods, 1953-57 and 1971-73

Commodity and group	1953-57	1971-73	Commodity and group	1953-57	1971-73
	Percent			*Percent*	
Wheat	6.9	6.1	Lettuce	0.53	0.7
Rye	.1	--	Onions	.23	.3
Rice	.9	1.1	Peas, green	.17	.1
All food grains	7.9	7.2	Peppers, green	.12	.1
			Sweet corn	.35	.3
Corn	5.4	8.0	Spinach	.06	--
Oats	.9	.4	Tomatoes	.97	1.0
Barley	.9	.7	Watermelons	.19	.2
Grain sorghum	.8	1.6	All commercial vegetables	4.20	4.1
All hay	1.1	1.4			
Feed grains and hay	9.1	12.1	Beans, dry edible	.4	.4
			Potatoes	1.3	1.3
American Upland cotton	8.3	2.9	Sweetpotatoes	.2	.1
American-Egyptian cotton	.1	--	All dry edible beans, potatoes		
All cotton	8.4	2.9	and sweetpotatoes	1.9	1.8
Tobacco	4.1	2.4	All crops	45.2	44.2
Cottonseed	.9	.5	Beef cattle	15.3	25.8
Peanuts	.5	.8	Calves	2.3	2.6
Flaxseed	.4	.1	Hogs	10.4	8.8
Soybeans	3.1	7.8	Sheep	.1	--
Oil-bearing crops	4.9	9.2	Lambs	1.0	--
			All meat animals	29.1	37.2
Apples	1.1	1.1			
Grapes	--	--	Milk, wholesale	12.6	11.1
Grapefruit	.3	.5	Milk, retail	.9	--
Lemons	.2	.3	Milkfat in cream	1.1	--
Oranges	1.5	1.5	All dairy products	14.6	11.1
Peaches	.7	.5			
Pears	.3	.2	Eggs	6.0	3.4
Strawberries	.5	.4	Chickens	3.6	--
All fruit	4.7	4.5	Broilers	--	3.1
			Turkeys	1.1	1.0
Asparagus	.17	.1	All poultry and eggs	10.7	7.5
Beans, snap	.34	.3			
Broccoli	.06	--	Wool	.4	--
Cabbage	.16	.2			
Cantaloups	.22	.2	Livestock and livestock		
Carrots	.18	.2	products	54.8	55.8
Cauliflower	.07	--			
Celery	.21	.2	All farm products	100.0	100.0
Cucumbers	.17	.2			

Note: -- negligible.

Source: (*15*).

- Average the price (season, or average monthly, depending on the commodity) received for the commodity over the most recent 10 years,[12]
- Obtain the adjusted base period price by dividing the 10-year average price by the average of the Index of Prices Received for the same 10-year period,
- Multiply the adjusted base price by the current parity index to obtain the new parity price.

As an illustration, the parity price for corn in July 1975 is computed below (*11*, p. 4):

- The 120-month average price (January 1965 through December 1974) received by farmers for corn after adjustment is $1.55,
- The adjusted base price equals $1.55 divided by 3.22 (average of the Prices Received Index over the the same 120 months) which yields $.481 per bushel,
- The July 1975 corn Parity Price is thus $.481 times 6.36 (the current Prices Paid Index), or $3.06.

[12]For price-supported commodities, an adjustment is made in the 10-year average price to remove the effects of unredeemed CCC loans and other payments.

ECONOMICS AND PARITY[13]

The parity ratio concept has been the subject of criticism since its inception. A basic contention is that the ratio is an inadequate and misleading indicator of the relative economic position of farmers. The rationale behind the criticism of both ratio and price is examined below.

LIMITATIONS OF THE PARITY RATIO

The parity ratio does not measure the economic well-being of farmers, though it is often thought to do so. As previously mentioned, the component indices which make up the ratio are based on an average price for all classes and grades of commodities. Thus, the parity ratio indicates purchasing power and, as such, it does not reflect returns to labor, management, or assets. Furthermore, since quantities are not included, the ratio reflects only a one-sided view of revenues and costs. The quantity weights used to construct the indices adjust prices by their relative importance in an average, aggregate input-output relationship for a specific base period. But the effects of input substitution and levels are ignored, as are those of output levels. Fuller and others argue that farmers are interested in parity income (income equal to that of the nonagricultural sector), and that a reasonable measure of farm economic status must include quantities (*3*, p. 697). Though the parity ratio has declined rather consistently since 1952, real net farm income has trended upward (fig. 1).[14]

Another major shortcoming of the parity ratio is that it does not adequately reflect technological changes. To some extent, revision of base periods reflects such changes, as well as shifts in tastes and preferences. Figure 2 illustrates the divergence of farm productivity (output/input) and the parity ratio. As an example, suppose a new variety of wheat with a 10-percent higher yield is introduced. Assuming no price or input changes, the parity ratio would not change, but the wheat farmer's income would rise 10 percent. Including production quantities would help to alleviate the parity ratio's insensitivity to technological change. For example, aggregate U.S. agricultural production increased 10 percent while input usage rose only 3 percent from 1960 to 1970 (*13*, p. 440). Assuming a constant input-output price ratio, the parity ratio would not change. But U.S. farmers were relatively better off, since the change in output sold outpaced the change in input use.

Figure 3 shows the relationship between cost of production and the parity ratio over time. Cost of production, like income and productivity, has increased because of higher input levels and factor costs. Since the denominator of the parity ratio is prices paid, one would expect the ratio to decline as input prices increase, if other prices remain constant. Since the parity ratio declined during the period shown, one may reason that output prices increased less rapidly than input prices. Or the noninput price component of the Prices Paid Index may have increased more rapidly than prices received for all commodities.

As mentioned, the parity ratio and parity price concepts were developed to measure the "economic well-being," defined as purchasing power, of the farm population. The ratio of per capita disposable farm income to per capita disposable nonfarm income is plotted against the parity ratio over time in figure 4. The income ratio

FIGURE 1
LEVELS OF PARITY RATIO— AND REAL NET FARM INCOME ····, 1952-74

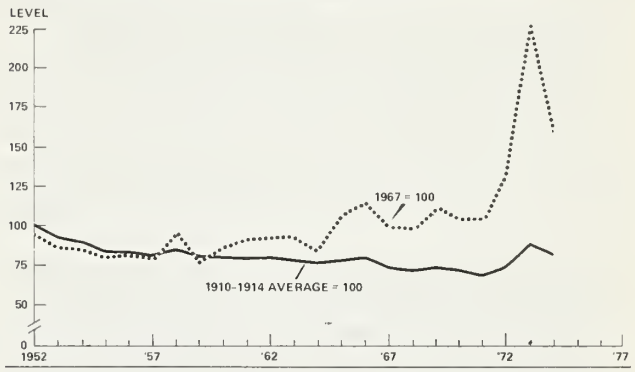


FIGURE 2
LEVELS OF PARITY RATIO— AND FARM PRODUCTION INDEX ····, 1952-74

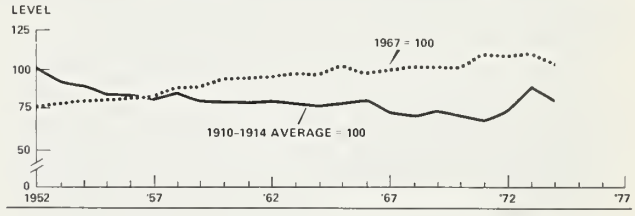
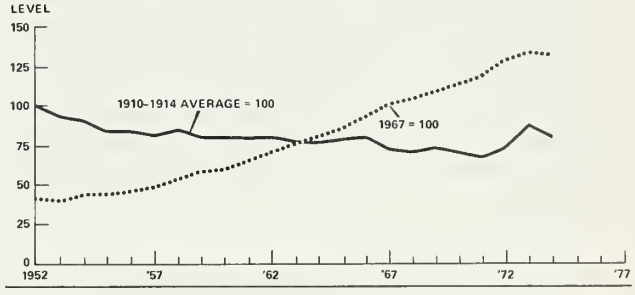


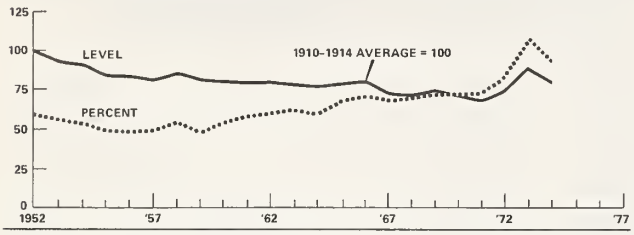
FIGURE 3
LEVELS OF PARITY RATIO— AND PRODUCTION COSTS PER FARM ····, 1952-1974



[13]Portions of this discussion draw heavily on (*3*)

[14]The parity ratio plotted in figures 1 through 4 corresponds to the earlier base period, 1953-57. Updating the base to 1971-73 resulted in minor changes.

FIGURE 4
PER CAPITA FARM INCOME (ALL SOURCES) AS PERCENTAGE OF PER CAPITA NONFARM INCOME,•••• AND LEVELS OF PARITY RATIO — 1952-74



should be interpreted with caution, because per capita disposable farm income includes income from all sources, and it does not reflect capital investment. Further, the relative income ratio reflects the economic well-being of the farm population relative to the nonfarm population, rather than economic well-being relative to a base period.

Another time-related factor which affects the usefulness of the parity ratio is the organization of the agricultural sector. Significant structural changes in both marketing and production have occurred since the 1910-1914 base period. (Since the last update, 1971-73, such change has perhaps been less important.) The three most striking structural changes are the increased role of marketing and purchasing associations, such as cooperatives; the growth of commercial agriculture; and changes within commercial agriculture, especially involving vertical integration. Marketing and purchasing associations have effectively integrated some production activities formerly performed by the farmer (*16*, p. 7). Thus, through time, the mix of farm output has changed. The advent of vertical integration has resulted in production-processing systems in which the farm agricultural product is not marketed until it appears as a finished, packaged product in the retail outlet. With vertical integration, the firm handles production activities not normally attributed to the "farmer." Such structural changes are not reflected in the parity ratio.

LIMITATIONS OF THE PARITY PRICE

Criticism of parity price has focused on three points in addition to general criticism of the parity ratio. First, there is no logical economic rationale for maintaining price relationships (from a particular base period) at a constant level over time (*3*, p. 696). Such an action inhibits market change because of the interaction of technology with supply and demand. The most prominent effect is on the "down-side" of prices. Artificial price supports may retard adjustment in resource allocation because artificially higher prices will hold resources that would otherwise have been bid away by other uses. In fact, holding price relationships constant will maintain resource allocation within the agricultural sector, *ceteris paribus*. The "new formula" parity price was, in part, directed at this problem. As mentioned, the new formula uses a 10-year average of prices received, whereas the old formula used, for most commodities, the average price received for the base period (1910-14). Thomsen and Foote argue that the new formula parity price is only partially effective because commodities with price support or acreage control programs have never been allowed to move to their natural supply-demand equilibrium, and they will never do so as long as Government programs affect prices (*9*).

Second, some parity prices may be self-escalating. Salsburg states that a feedback effect may exist in which price increases feed themselves (*6*, p. 12). Recall that the parity price for a particular commodity is computed by dividing the 10-year average price by the 10-year average of the Index of Prices Received. The result is multiplied by the Index of Prices Paid. If the price of any farm commodity in the Prices Paid Index increases, its parity price will tend to increase because the index will increase. For example, corn is included in the Index of Prices Paid as a production expense (as feed), and is also included as a basic commodity with a parity price in the Index. Thus, if the corn price increases, the parity price will increase for two reasons; the 10-year average price received will go up and the Index of Prices Paid will rise because corn is one of its components. Assuming the price of corn were to be supported at 90 percent of parity, for example, the cycle would feed upon itself and the corn parity price would continue to increase year by year.

Third, parity prices may not reflect inflation, especially across sectors. The Index of Prices Paid and the Index of Prices Received conceptually refer to an "average" farmer who produces all agricultural products included in the second index and consumes all items in the first index. Suppose that the inflation rate in the midwestern corn-producing areas is lower than the national average. In general, this disparity will cause the Prices Received Index to increase more rapidly than would the 10-year average price of corn. Thus, with other factors constant, the corn parity price would not adjust to inflation at the same rate as would the parity prices of commodities produced outside the Midwest because the Prices Received Index is increasing at a faster rate than the average corn price. If the Midwest's inflation rate were higher, the opposite behavior would occur.

Because of problems with the parity ratio-parity price construct, several alternatives have been proposed as measures of farmers' economic well-being, such as use of income or returns. One of the more interesting proposals is that of parity returns (*3*). A discussion of parity income, measurement of farmers. well-being, and associated issues can be found in (*4*). ERS researchers are currently studying production costs to evaluate their use as indicators of economic well-being in agriculture. The article "Cost of Production: Replacement for Parity?" in this *Review* further examines this area.

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COST OF PRODUCTION: A REPLACEMENT FOR PARITY?

By Jerry A. Sharples and Ronald Krenz*

ABSTRACT

Cost of production could replace parity as the common measure for assessing the equity of returns to agriculture. Parity has been cited as obsolete because of its inability to include productivity as a factor. Inherent difficulties within the cost of production measure, which does include productivity, are discussed, such as defining a basis for assigning costs to land and management. The problems both in measuring costs of production of farm commodities, and in linking target prices and loan rates to such costs are addressed. In particular, a land price spiral can occur when target prices and loan rates are linked to cost of production. The Congress inserted a provision in the Agriculture and Consumer Protection Act of 1973 which directed the Secretary of Agriculture to conduct a study of the cost of producing feed grains, wheat, cotton, and milk. While the intended use of results is uncertain, such data could provide a basis for future evaluation of loan rates and target prices.

KEYWORDS: Cost of production, target price, loan rate, land price spiral, parity, equity, returns.

BACKGROUND

Agricultural legislation since 1929 has been aimed principally at supporting prices of major farm products, hence, farm income. A basic guide, sometimes explicitly stated, more often implied, has been the economic well-being of the farm sector relative to the nonfarm sectors of the economy. A measure of this relative economic well-being which gained widespread acceptance and use is the "parity" concept. Generally, parity is supposed to represent a purchasing power for farm producers on a par with that of an earlier base period.

Since its inception, the parity concept has often been questioned. Recently, USDA Director of Agricultural Economics, Don Paarlberg, in remarks to members of the USDA's Cost of Production Advisory Committee, stated (*2*):[1]

> The Congress is coming to the opinion that parity, which has been used for 40 years as the basis of establishing loan levels, establishing price targets, has become, in some measure, obsolete. Its acceptance to the public is no longer as great as it once was, all these things dating back to a period now 65 years ago.

The parity concept and its inherent limitations are treated in the article by Forrest Holland in this publication. The limitations noted have led to searches for criteria for a new guiding tenet of agricultural policy. Cost of production has been suggested as a candidate. The major objection to parity has been that it only reflects prices and price changes, but not technological change. The cost of producing a bushel of wheat, however, reflects changes in both input prices and in output per unit of input. Thus, cost of production should overcome this limitation of parity as a measure of equitable price levels.

A step in the direction of more prominent use of cost of production in agricultural policy was taken in the Agri-

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[1] Italicized numbers in parentheses refer to items in References at the end of this article.

cultural and Consumer Protection Act of 1973. The Congress inserted a provision directing the Secretary ofAgriculture to conduct a study of the cost of producing feed grains, wheat, cotton, and milk. The results were to be used to "establish a current national weighted average cost of production" for the selected commodities. While the intended use of the data is not certain, the context suggests that policymakers might use them to evaluate loan rates and target prices. A direct linkage was proposed in a bill (S.1857) introduced by Senator Henry L. Bellmon in which loan and target levels would be indexed to individual commodities' cost of production. While the notion of guaranteeing producers their cost of production plus a "reasonable" profit has great appeal, there are subtle and significant implications in using cost of production as a measure. The desirability of using such a measure to establish and adjust loan rates and target prices is not unanimously accepted. The notion has the appeal of simplicity and fairness, but inherent problems exist both in measuring the cost of producing farm commodities and in linking target prices and loan rates to that cost. We discuss both problems in this article.

PROBLEMS IN MEASUREMENT

To someone unfamiliar with agriculture, the question of estimating farm production costs seems relatively simple: "Just ask farmers what it costs them to produce a certain commodity." Unfortunately, major difficulties exist, including: (1) the lack of market-determined price information for the farmer's own labor and management, (2) the problems of computing a cost for use of cropland, and (3) the extremely wide variability in cost of producing a farm commodity across the United States.

PRICES OF LABOR AND MANAGEMENT

In many other industries, labor and management costs are relatively easy to determine because both inputs are hired. However, in agriculture, the farmer and farm family provide a significant share of the labor and management. Estimating costs of these inputs creates certain problems.

The farmer receives as a residual the difference between total cash receipts and total cash expenses. This amount in effect becomes a return to all of the farmer's "owned" inputs, such as family labor, management, machinery, capital, land, and the farmer's risk taking. It is almost impossible both in theory and practice to determine how this total residual return should be divided (allocated) among the various inputs. But when costs must be estimated, a price must be put on labor. One could take the wage rate for hired workers and apply this to the operator's labor, but this method ignores the quality of the labor and any intermingled management skills. Another way to estimate the operator's labor cost is to use the wage rate the farmer could receive if employed in some other business—the opportunity cost. This concept has a sound theoretical basis, but, in practice, a farmer's opportunity wage rate is seldom known.

Professional farm management firms offer management services on a fee basis. Such firms manage a farm for an absentee landowner, often for a percentage of the gross receipts. These farm managers usually make the major decisions, such as crops to be grown on specific fields, varieties to plant, fertilizer use, and timing of crop sales. Generally, a hired tenant makes day-to-day supervisory decisions. We are left to guess what this supervisory role is really worth or how it should be included in the cost of production.

THE "COST" OF LAND

Land is one of the major inputs necessary to produce most farm commodities. A cost for land based on current land values and interest rates will range from 25 to 50 percent of the total costs of production for most crops. But computing this major cost component is complex and, by necessity, it may be somewhat arbitrary. Factors other than expected earnings from farming affect the land's value. Also, alternative methods exist to compute a land charge component of the cost of production. The choice of method has a big impact on the total cost of production.

What determines the value of farmland? Much farmland is purchased for reasons other than production, particularly such land around cities and towns. This land has some added value because it might be used in the future for urban development. This speculative value is not easy to measure.

Farmland is also considered a good hedge against inflation. U.S. land values have been increasing for the past 40 years and, obviously, they are expected to continue to increase. If landowners can expect a 3-4 percent per year appreciation in land values, perhaps this amount ought to be considered as part of the return to land. Thus, the interest rate used in estimating production costs should be reduced by the same 3-4 percent.

Another factor in the farmland market is that a large percentage of farmland transactions occurs between family members. Land is often sold to relatives at preferred prices which do not represent bona fide sales. This method is often used to help young farmers get started or keep the farm in the family.

One alternative in setting land values is to ask farmers what they paid for their land (the acquisition value) and to use that as a basis for determining the cost of production. Only about 3 percent of U.S. farmland is sold each year, indicating that, across the Nation, the average

length of ownership is about 33 years. Hence, what most farmers originally paid for their land is far from what it would sell for currently.

One could attempt to separate out the many forces in the land market and try to estimate the current "agricultural value" of land. Even this process is complex. Because of transportation costs, land closer to good roads or cities will be valued higher for agricultural purposes than will land that is farther away. Also, land productivity is extremely variable in some geographic areas. Research has indicated that most farmers who buy land strictly for agricultural purposes are doing so to increase the size of their operations. Many farmers can increase the size of their operation by adding land because they already have adequate machinery and management. Thus, they can farm more acres with the same amounts of some inputs. From economies-of-size studies, we know that per unit costs are generally less on larger farms, though limits exist as to the economies. Through expansion, farmers can thus spread their machinery ownership, management, and, possibly, other costs over more acres, reducing their per unit costs. However, a farmer could probably not afford to pay the same price for all his land that he can afford to pay for that additional 100 acres which enable production efficiencies. Yet it is this producer who helps determine the prices against which other farmers must compete for the available land.

Obviously, the estimation of land costs based on current land values presents many problems. For some crops, one can approximate the cost of obtaining the productive services of land on an annual basis without encountering the investment problems noted above. Much farmland is rented either for cash or a share of the crop. What a farmer is willing to pay in cash to farm the land for 1 year obviously represents his estimate of its value in production. The laws of supply and demand tend to equate the rental value with this productive value. This rental rate will not always give a landowner a rate of return comparable to other nonfarm investments because of the appreciation factor mentioned above. But the rental rate is a rate acceptable to both the tenant and the landowner and it also adjusts over time to meet changing conditions.

Information on both cash and share rental costs is readily accessible. Hence, it provides a satisfactory procedure for estimating land costs for most crops in most areas. Unfortunately, such rental practices are not universal. In irrigated areas, for example, relatively less land is rented on either a cash or share basis.

THE DATA

Despite all the inherent limitations mentioned above, assumptions can be made and a production cost estimate obtained for a unit of production.

As a result of the Congressional mandate, ERS has conducted the first consistent nationwide survey to obtain the 1974 costs of producing major crops. The assumptions, procedures, and results of the survey of 1974 costs of producing cotton, corn, grain sorghum, barley, wheat, peanuts, and also milk have been reported (*3*, *4*, *5*). Over a 4-year period, ERS plans to survey all major crops, fruit and vegetable specialty crops, livestock, and poultry. These surveys will be repeated every 4 years with cost change estimates provided in between. The first of these updated cost estimates has been reported (*1*).

Two conclusions from the data are relevant here. First, the choice of method for computing a land cost had a major impact on the updated cost of production; and second, weather and other factors caused costs to vary considerably among farms and regions. Six methods were used for computing the land cost (described in the footnotes to table 1); and the estimates differed substantially by method. For example, the national average total cost of producing a bushel of corn in 1974 was $2.00 based upon land valued at its purchase price ($1.62 + $0.44 - $0.06 = $2.00; see table 1). But the cost was $2.61 when land cost was based upon current value. Other methods led to costs ranging between $2.00 and $2.61.

The substantial variability among farms in total and direct cost of production of various commodities is evident in figures 1 through 4, constructed from the 1974

Table 1.—Average corn production costs per bushel, 1974

Cost item	Cost per bushel[1]
	Dollars
Total direct cost[2]	1.31
Overhead and management	0.31
Land cost:	
Ownership, current value[3]	1.05
Ownership, purchase value[4]	0.44
Net share rent[5]	1.15
Cash rent[6]	0.55
Composite, current value[7]	1.03
Composite, purchase value[8]	0.77
Value of secondary product[9]	0.06

Source: (*4*, page XV).

[1] The national corn yield in 1974 was 74.3 bushels per acre. [2] Direct costs include seed, fertilizer, pesticides, other chemicals, fuel, lubricants, machinery repair, drying, irrigation water, hired labor, and interest and replacement costs on machinery, power, and irrigation equipment. [3] Estimated average value of cropland at time of acquisition by current operator multiplied by current interest rates on Federal Land Bank mortgage loans. [5] The landlord's share of receipts minus any shared crop expenses. For operators not share renting, prevailing share rental rates of the subregion were applied. [6] Average cash rent payments per acre of cropland. For operators not cash renting, prevailing average cash rental rates in the subregion were applied. [7] Prevailing tenure arrangements on each farm, reflecting actual combination of cash rent, net share rent, and owner-operation. Current values of owned cropland are used in this method. [8] The same method as in footnote 7, except that, for owned land, the average value of cropland at time of acquisition is used. [9] Silage and grazing.

survey (*4*). For example, the direct costs of fertilizer, seed, chemicals, custom operations, labor, fuel, interest, machinery ownership, and maintenance to produce a bushel of corn were less than 90 cents for the lowest-cost 10 percent of 1974 production, but they exceeded $2 for the highest 10 percent. Total cost ranged from $1 to $5, with most corn produced at between $2 and $3 per bushel.

Figure 1
CUMULATION OF CORN PRODUCTION
by Cost Levels *

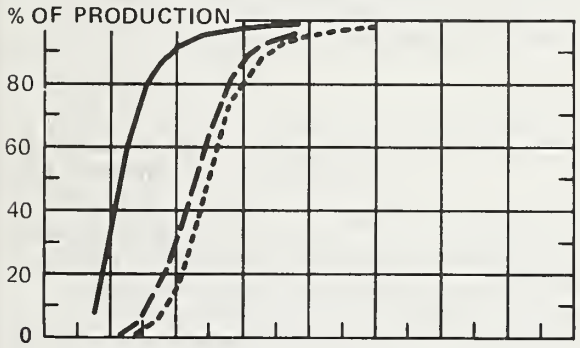


Figure 2
CUMULATION OF ALL WHEAT PRODUCTION
by Cost Levels *

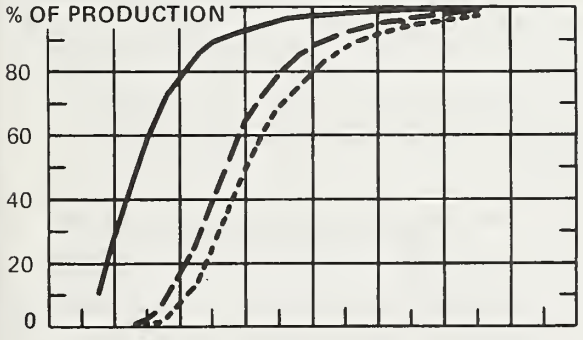


Figure 3
CUMULATION OF SOYBEAN PRODUCTION
by Cost Levels *

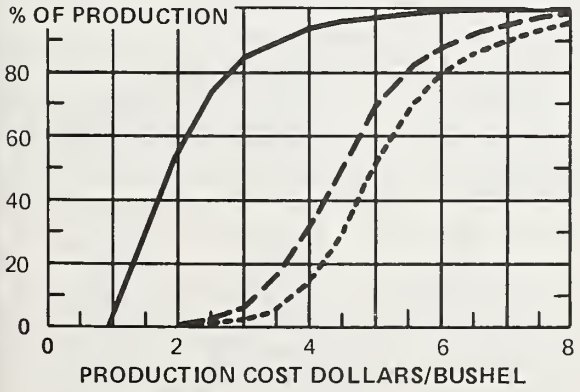
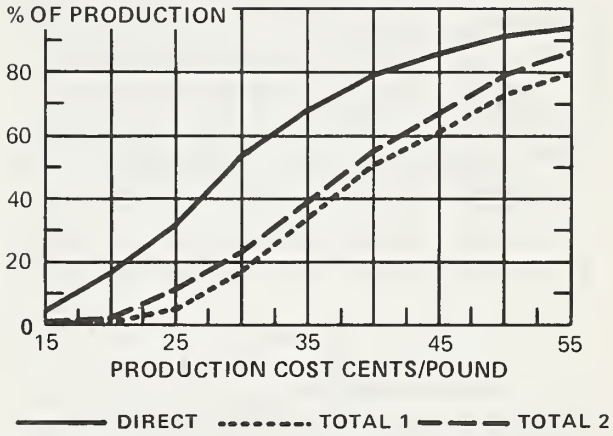


Figure 4
CUMULATION OF COTTON PRODUCTION
by Cost Levels *



All subregions.

* Total cost includes direct costs plus charges for management, overhead, and land costs. Total 1 is a composite weighting of the acreage actually share rented, cash rented, or owned by the operator, based on current cropland value. Total 2 is the same as total 1 except that owner-operator allocation is based on cropland purchase value.

Costs per unit vary among farms for many reasons. First, a farmer's actual production usually does not equal his expected production. He may have $200 per acre invested in his corn crop by the time it is planted. With good weather and a 120-bushel yield per acre, the cost is $1.67 per bushel. If bad weather results in an 80-bushel yield, the cost is $2.50 per bushel. Weather impacts also cause measurement problems between years. For example, the 1974 corn yield of 74.3 bushels per acre was unusually low. With normal weather conditions, the yield would have been 20 to 25 percent higher, and costs per bushel, much lower. If farmers had obtained 1973 corn yields in 1974, their costs would have been reduced over 20 percent per bushel.

Second, geographic location affects both price and cost of production. The price of corn in Arizona is typically $0.75-$1.00 higher than in Iowa. Cost of production in Arizona is also higher by a similar amount. The price differential results from economic factors such as the distance to major markets, or the fact that an area has a feed surplus or feed deficit. The price differential affects the value of land, irrigation water, and other fixed resources so that, ultimately, the regional difference in the cost of producing a crop generally reflects the price differential.

Third, costs vary because of the wide range in management skills of individual producers. Efficient use of fertilizer, proper application of pesticides, and efficient management of machinery inventory all help reduce the cost

per unit of output. Some farmers are highly skilled in the business aspects—input purchases and product sales; others have greater skill in machinery repair and maintenance; and some excel in production practices, such as selection of seed and the timing of operations, detection of crop or livestock diseases, and so on. Some farmers reduce costs by timing their purchases—paying lower prices for fertilizer purchased in the fall and stored until spring planting time. Also, some farmers are simply more astute in shopping and bargaining than others.

Fourth, the size of the farm affects cost per unit of output. Operators of large farms achieve efficiencies by being able to gain some price advantages through purchase of large quantities and more efficient use of their resources, especially machinery.

After some inspection it becomes obvious that estimating farm production costs is not easy. Many assumptions must be made, and legitimate alternative approaches can yield a wide range in estimates. Testing to determine "true" costs is both difficult and expensive. Hence, cost of production estimates should always be examined with extreme caution and used with extreme care.

LINKING THE TARGET PRICE AND LOAN RATE TO COST OF PRODUCTION

The target price-deficiency payment and the loan rate are used to achieve related but different objectives, and they have different impacts upon commodity production and resource use. (These implications are discussed in the article by Penn and Brown elsewhere in this *Review*.) Relative to their linkage to cost of production, two major issues are discussed here: (a) How to prevent building in a land price spiral; and (b) how high to set target price and loan rate relative to the cost of production.

THE LAND PRICE SPIRAL

A major potential problem in linking target prices and loan rates to some average cost of production is that a land cost spiral might get built in. A spiral exists when the loan rate or target price is high enough to cause an increase in land prices. In turn, cost of production, increases, raising the target price or loan rate. Their higher levels further boost land prices, and the process continues—in a never-ending cycle.

A key linkage in the land cost spiral occurs between the price farmers are willing to pay for cropland and the prices they expect to receive from the sale of future crops. If they expect a high price, they will be willing to pay more to buy or rent land, a fact dramatically evident over the last 5 years. Crop prices increased a modest 14 percent from 1967 to 1972 and U.S. average farmland values rose 28 percent. Since 1972, crop prices have gone up 76 percent; land values, 83 percent. Land values are still rising in 1976 as farmers remain aggressive bidders for land in anticipation of continued high crop prices. As crop prices increase, farmers' expectations of future prices increase, and land prices mount. The component of crop cost of production associated with the use of cropland has also gone up (other costs have risen as well, but for other reasons).

The land price spiral can be illustrated with hypothetical data on average cost of producing corn over a 5-year period (table 2). First assume the production costs per bushel increase 3 percent per year. In column 3 of table 2, the land charge is computed with two assumptions: no target price for corn; and farmers' expectations of receiving a market price from, say, $2.20 to $2.80 per bushel. The price of land and land rental fees would likely increase each year as the more efficient farmers (those with the low costs of production in fig. 1) bid up the price of land. These farmers could still make a profit with higher priced land. Consequently, total cost of production would increase, as shown in column 4 of the table.

Now assume that back in the first year new legislation was passed defining a target price equal to the annually updated current total cost of production. Farmers would then have different price expectations. They would know

Table 2.—Hypothetical average cost of producing corn in the United States, 5 consecutive years

(1) Year	(2) Other production cost/bushel[1]	(3) Land charge[2]	(4) Total cost	(5) Revised land charge[3]	(6) Revised total cost	(7) Other production costs plus $1
	Dollars per bushel					
1	1.50	1.00	2.50	1.00	2.50	2.50
2	1.54	1.05	2.59	1.10	2.64	2.54
3	1.59	1.10	2.69	1.21	2.80	2.59
4	1.64	1.16	2.80	1.33	2.97	2.64
5	1.69	1.22	2.91	1.46	3.15	2.69

[1] Includes all costs but a land charge; and it is assumed to increase 3 percent per year. Input prices are assumed to increase at a more rapid rate but yield increases reduce the per bushel cost increase to 3 percent. [2] A 5-percent annual increase assumed. [3] A 10-percent annual increase assumed.

that they would receive a deficiency payment if the price dropped below the target, and they would know that the target price would increase if land prices and land rent increased. Thus, farmers could pay more for land and have their investment protected by the Government. Land prices could easily escalate at an annual 10-percent rate (column 5, table 2), resulting in a certain total cost over time (column 6). The target price indexed to cost of production would result in a continually escalating price of land, hence, an increasing cost for land as a factor of production, greater total costs, and, consequently, higher Government payments.

The example shows the impact of a target price set at 100 percent of the cost of production. The principles are the same if a smaller percentage is substituted, but the impact on land prices would be less.

Target prices could force land prices up even if no deficiency payments were made. The only ingredient necessary for raising land prices is an increase in farmers' expectations of earnings from their land (a decrease in uncertainty). Target prices set at total cost of production would obviously raise farmers earnings expectations.

Another way to link the target price to the cost of production is to set the target equal to all production costs other than land *plus* a fixed quantity for a land charge. In column 7 of table 2, a land charge of $1 per bushel is added to the other costs of production each year. The logic for including a constant amount might be that the target price objective is to cover other costs plus a fixed return to land over time, rather than promote spiraling land charges. This method also would increase farmers' earnings expectations. But the impact upon the value of cropland would be once and for all, since the land charge would remain constant in the target price formula.

The cost spiral problem could also arise when loan rates are directly linked to the cost of production. The principles are the same but the mathematics might differ. The target price gets capitalized directly into cropland with an allotment, whereas the increase in earnings provided by the loan rate gets capitalized into all the farm operator's fixed resources—labor, management, and land.

LEVEL OF TARGET PRICE AND LOAN RATE

A foremost issue in a debate on the use of target prices and loan rates is the level at which they should be set. If they are linked to the cost of production, what costs should be covered? Further, what goal or objective will they be used to achieve? Should they be just high enough to help farmers through the occasional difficult year or should they be used generally and consistently to support farmers' incomes? One's point of view and interests generally determine which goal he supports. Two alternative outlooks follow.

TWO ALTERNATIVE OUTLOOKS INVOLVING USE OF TARGET PRICES AND LOAN RATES

USE FOR EMERGENCIES

In this first outlook for the future of U.S. agriculture, the general level of farm prices is relatively high but highly variable. However, society considers it necessary to help farmers through temporary periods of severe price declines. Market prices are allowed to allocate resources within agriculture and between agricultural and nonagricultural sectors. Healthy domestic and foreign demand for farm products is expected. The major resource maladjustments between farm and city of the past decades have been nearly overcome. Thus, there is little justification for longrun support of farm prices and income. The market usually will provide an equitable return to a farmer's resources. But because of weather-related yield variability at home and around the world, supply of grains and soybean supplies will fluctuate greatly from year to year, causing large variations in prices and farm income. If U.S. farmers are to produce fence to fence for world markets and be subjected to supply and demand conditions in other countries, they will be vulnerable to wide swings in prices. These wide swings can disrupt planning and resource allocation among both producers and consumers.

Given this outlook, society could use target prices and loan rates to provide farmers some protection against unusually low prices for the major crops. This use would be consistent with a view that food production is important enough to transfer part of the risk from the individual farmer to society which, in the aggregate, can better cope with it.

USE TO SUPPORT FARM INCOME

This outlook for U.S. agriculture basically does not differ from that of the 1960's. Without Government support, farm prices are too low to cover 1976-level costs of production. The early 1970's are viewed as a temporary deviation from the continuing trend of (1) excess capacity and overproduction in U.S. agriculture, (2) more yield increases due to technological advances, (3) "inequitable" low returns to farmers, and (4) further need for major resource adjustment (especially of labor) out of farming. Effective demand will increase slower than production potential. Production will also increase in other exporting countries and the United States may not necessarily have a competitive advantage. Thus, U.S. farmers will demand (and society might provide) income support to make their income more equitable relative to the nonfarm sector.

In this outlook, the market price likely would be chronically below the target price and close to the loan rate. Deficiency payments would be expected most years and Government stocks of grain would grow as farmers exercised their option to not pay off their nonrecourse loans.

COMPARISONS

In either outlook, cost of producing a crop would, in time, approximate the average market price. If the average market price was expected to be high, as in the first outlook, production cost would be high. If the market price were lower, as in the second outlook, production cost would tend to be lower. The costs that adjust are the residual claimants of the returns—the farmer's owned land, management, and family labor.

Thus, in the first outlook, loan rates and target prices should be set well below the *total* cost of production. The market price would generally provide an equitable return but the Government would stand ready to buffer the farmer from the unusually low prices. In the second outlook, the loan rate, market price, and total cost of production would eventually become approximately the same. The loan rate would support the market price, and the target price-deficency payment would provide some additional income to the owners of cropland with allotments.

CONCLUSIONS

As a guide for setting loan rates and target prices, the cost of production concept may overcome some limitations of the parity concept. The former, unlike the parity concept, reflects changes in the prices of both inputs *and* output per unit of input. But problems also exist with the cost of production concept. Production costs are difficult to measure; they vary considerably among farmers. To obtain an estimate of the average cost for all U.S. farmers, expensive survey techniques must be used; and even then many assumptions must be made. Legitimate alternative assumptions can lead to major differences in cost estimates.

Once an acceptable procedure is defined for obtaining a cost of production figure for each commodity, there are problems associated with linking the loan rate and target price to that figure. The primary one is that a land cost spiral could be built into the linkage. This spiral may be prevented if the portion of production cost associated with the cost of using the cropland is excluded or it is held constant over time.

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TARGET PRICE AND LOAN RATE CONCEPTS FOR AGRICULTURAL COMMODITIES

By
J. B. Penn and W. H. Brown*

ABSTRACT

Concepts are defined, provisions explained, computation formulas presented, ranges of payments shown, and examples provided to aid in understanding current Federal laws regarding U.S. agricultural commodities.

KEYWORDS: Target price, nonrecourse commodity loans, commodity deficiency payments, acreage allotments, disaster payments, agricultural and food policy.

INTRODUCTION AND DEFINITIONS

Government participation in the agricultural sector is aimed at maintaining an economically viable food and fiber system. Since 1929, policies have been primarily oriented toward agricultural production, and programs have attempted to maintain commodity prices and farm incomes at levels high enough for continued efficient operation. Currently prevailing agricultural policy is largely embodied in the provisions of the Agriculture and Consumer Protection Act of 1973, applicable through the 1977 crop year.

A unique feature of the 1973 act is the introduction of the target price concept for major agricultural commodities.[1] Previous commodity price supports were related to parity prices—prices based on levels obtaining in the 1910-1914 base period. The 1973 act specifies target prices, loan rates, deficiency and disaster payments, and acreage allotments. Provisions for future adjustments of target prices are also included.

Target price and loan rate provisions are parts of the 1973 act that are frequently discussed but often not fully understood. This report briefly describes the concepts and mechanics of target prices and loans in a simplified manner.

The purpose of the *target price* concept is to provide a basis for varying support payments to producers inversely with the market price. Under this concept no payments are made if the market price is at or above the target price. If the market price goes below the target price, support payments are based upon the differential.

Target prices were initially established for wheat, feed grains, and cotton for which (along with other crops) loan rates also were established. Recently enacted legislation altered the rice program by changing price supports based on parity to the target price-loan rate concept operative for other crops. The target prices and loan rates for 1975 and 1976 are shown in table 1.

Target prices are the basis for calculating deficiency and disaster payments to producers. *Deficiency payments* are made when the average market price received by farmers during the first 5 months of the marketing year (calendar year for cotton) is less than the target price. The payment rate is the smaller of two differences: first, between the target price and the average market price and second, between the target price and the loan rate. *Disaster payments* are made when natural disasters prevent normal planting operations or, after the crop is planted, cause reduced production to two-thirds of "normal." The disaster payment rate is then the deficiency payment rate or one-third of the target price, whichever is the larger.

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[1]The concept of target prices was first proposed in the late 1940's in the "Brannan Plan." The target price mechanism was to operate essentially as currently structured but with coverage applicable only to perishable commodities.

Table 1—Target prices and loan rates for major commodities, 1975-76

Commodity	Unit	1975		1976	
		Target prices	Loan rates	Target prices	Loan rates
Wheat	Dol./bu.	$2.05	$1.37	$2.29	$1.50
Corn	do.	1.38	1.10	1.57	1.25
Sorghum	do.	1.31	1.05	1.49	1.19
Barley	do.	1.13	.90	1.28	1.02
Oats	do.	NA	.54	NA	.60
Rye	do.	NA	.89	NA	1.00
Upland cotton	Cents/lb.	38.00	34.27	43.20	37.12
Rice	Dol./cwt.	NA	8.52	8.00[1]	6.00[1]
Soybeans	Dol./bu.	NA	NA	NA	2.50

Note: NA means not applicable.

[1] Preliminary—these rates are to be adjusted for the increase in the Index of Prices Paid for Production Items, Interest, Taxes, and Wage Rates from the date the Rice Production Act of 1975 was signed to July 31, 1976 for final rates for 1976.

Deficiency payments are viewed as income supplements to producers, moderating the effects of short-term price fluctuations. Disaster payments are similarly viewed, protecting the producer against the impacts of natural disasters. These direct payments are based on only the normal production from a specified allotted acreage ("normal" yield times the allotment), in contrast to loans for commodities which can apply to all or any part of production (excepting rice, for which loans can be made only on "normal production").

Acreage allotments are used to determine the production eligible for deficiency and disaster payments. In the past, farm allotments usually have been based upon historical acreages and have been adjusted to meet changes in expected demand. The national allotments are currently established annually by the Secretary of Agriculture and at levels consistent with expected domestic and foreign utilization considering carryover stock levels. (For example, the 1976 wheat allotment, announced April 10, 1975, was set at 61.6 million acres. In November, the feed grain allotment was set at 89 million acres, and cotton at 11 million acres.) The national allotment is then apportioned to States, counties, and individual producers. Participants may produce any acreage of the above crops or designated substitute crops, but deficiency and disaster payments apply only to allotted acreages.

Nonrecourse commodity loans are currently available to producers of eligible commodities by applying to the local office of the Agricultural Stabilization and Conservation Service (ASCS—the program administering agency of USDA). In the past, more stringent requirements for participation (eligibility for loans) included compliance with program provisions relating to setting aside crop acreage for conservation uses and, on occasion, additionally maintaining a minimum conserving base acreage.

Nonrecourse loans are available from USDA's Commodity Credit Corporation (CCC). With these loans, the producer pledges specific amounts of a commodity as collateral, and the amount that can be borrowed is equal to the loan rate times the quantity put under loan. Producers have a specified time period in which they may repay the loan plus interest and storage charges (or provide storage) and thus regain possession of the commodity. Loans offer producers an opportunity to obtain cash and hold their crops for later sale and to even out marketings. If they choose not to redeem the loan upon its expiration, the CCC takes title to the stored commodity as full payment of the loan. No interest is paid on the loan but storage is either paid for or provided by the producer.

HOW THE PROVISIONS WORK

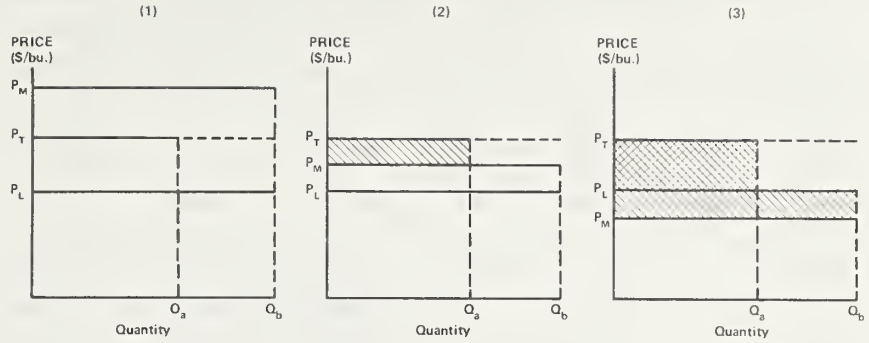
Operation of the target price and loan rate provisions of commodity programs may be simply illustrated considering three situations:

(1) Market price above target price and loan rate levels. This is illustrated in the left panel of the figure, which indicates no deficiency payments would be made and producers would elect to dispose of their products in the "open" market at the higher price (P_M).

(2) The market price for the specified period (first 5 months of marketing year or, for cotton, calendar year) is below the established target price but substantially above the loan rate level. This is depicted in the center panel of the figure. Deficiency payments would be based on the difference between the target price and the market price times the quantity of production eligible $(P_T - P_M) \times Q_a$.

(3) The market price for the specified period is below both the target price and loan rate levels. As shown in the right panel of the figure, deficiency payments of $(P_T - P_L) \times Q_a$ would be made. Producers would likely elect to place commodities in the nonrecourse loan program. If unredeemed, the price received for the product would be the loan rate on all production placed in the loan (Q_b) plus the additional deficiency payment on the normal production from the allotted acreage (Q_a). (In actuality, the loan rate becomes a floor price and the market price is unlikely to fall below it.)

TARGET PRICE AND LOAN RATE OPERATION



COMPUTATION OF TARGET PRICE ADJUSTMENTS

Target price adjustments are based on changes in USDA's Index of Prices Paid For Production Items, Interest, Taxes, and Wage Rates (PPI) and changes in the 3-year moving average of individual crop yields. While upward adjustments caused by increases in the PPI can be partially or totally offset by increases in average yields, the legislation is interpreted to preclude reductions caused by yield increases below the previous year's level. However, the target price may fall below the previous year's level due to declines in the PPI.

Annual adjustments in the initially established target price levels began with the 1976 crop. The initial levels established in the 1973 act are shown in table 2 along with 1976 levels. The estimates also serve to illustrate adjustment calculations using changes in the PPI and average yields occurring from 1974 to 1975.

Specifically, target prices are adjusted by the following general formula. Its two major components relate to changes in the PPI and the 3-year average yields.

$$P_T(t) = P_T(t\text{-}1)\left[1 + \left(\frac{PPI(t\text{-}1) - PPI(t\text{-}2)}{PPI(t\text{-}2)} - \frac{\bar{Y}_1 - \bar{Y}_2}{\bar{Y}_2}\right)\right]$$

$$= P_T(t\text{-}1)\left[1 + (\triangle PPI - \triangle \bar{Y})\right]$$

Subject to: $P_T(t) = P_T(t\text{-}1)$ (if $\triangle PPI < \triangle \bar{Y}$)

Where $P_T(t)$ = target price for current year (t),
$P_T(t\text{-}1)$ = target price for previous year (t-1)

PPI(t-1) = Annual Index of Prices Paid for Production Items, Interest, Taxes, and Wage Rates of previous year (t-1),

PPI(t-2) = Annual Index of Prices Paid for Production Items, Interest, Taxes, and Wage Rates of year previous to last (t-2),

$\bar{Y}_1$ = Three-year average yield for the 3 years previous to year (t), i.e., (t-1) through (t-3),

$\bar{Y}_2$ = Three-year average yield for the 3 years previous to (t-1), i.e., (t-2) through (t-4).

A numerical example for wheat using data from table 2 illustrates the calculations:

$$P_T(1976) = \$2.05\left[1 + \left(\frac{677\text{-}620}{620} - \frac{29.9\text{-}30.6}{30.6}\right)\right]$$

$$= \$2.05\left[1 + (.0920) - (-.0229)\right]$$

$$= \$2.05 \quad (1.1148)$$

$$= \$2.29$$

where

$(\triangle PPI = .0919) > (\triangle Y = -.0229)$

Table 2—Initial target price levels and 1976 adjustments

Item	Unit	1974	1975	Percentage change 1974-75	1976
Target prices:					
Wheat	Dol./bu.	2.05	2.05		2.29
Corn	do.	1.38	1.38		1.57
Cotton	Cents/lb.	38.00	38.00		43.20
PPI (1910-14=100)[1]	Index	620	677	+9.19	
3-year average yield Years		(1972-74)	(1973-75)		
Wheat	Bu./acre	30.6	29.9	-2.29	
Corn	do.	86.6	82.9	-4.27	
Cotton	Lb./acre	489	467	-4.50	
Adjustment in target prices:					
Wheat	Pct.			+11.48	
Corn	do.			+13.46	
Cotton	do.			+13.69	

[1] Annual average of Index of Prices Paid for Production Items, Interest, Taxes, and Wage Rates. (This should not be confused with the Parity Index which contains family living expenses.)

NOTE: On May 28, 1976, USDA's Statistical Reporting Service released revised index numbers of prices received and prices paid by farmers. The revised indexes for January 1965-April 1976, based upon revised item and group weights, are reported in *Index Numbers of Prices Received and Prices Paid by Farmers*, Pr1-5(76), Statistical Reporting Service, U.S. Department of Agriculture, May 28, 1976.

The revised annual average value of the PPI is 604 for 1974 and 663 for 1975. This represents a 9.77-percent increase, compared to 9.19 percent with the original values. The effect of the revision upon the target prices is slight. Target prices calculated for 1976 based on the revised PPI are shown below:

Commodity	Unit	1976 target prices if based on revised PPI
Wheat	Dol./bu.	2.30
Corn	do.	1.57
Cotton	Cents/lb.	43.42
Sorghum	Dol./bu.	1.49
Barley	do.	1.28

Since the 1976 target prices were announced prior to the index revision, they will remain unchanged. However, adjustments for 1977 will be calculated using the revised indexes.

LOAN RATE ADJUSTMENTS

Legislation currently in force does not contain a formula mechanism for loan rate adjustment as for target prices. Generally, bounds are prescribed for specific crops and the Secretary of Agriculture is allowed discretion in setting levels within those bounds. For commodities other than cotton, the loan rates generally have some relation to the parity prices. Details for individual commodities are shown in table 3.

Table 3—Loan rates and ranges for major commodities, 1976

Commodity	Limits of USDA's discretion in setting levels		1976 parity price[1]	Possible range		1976 loan rate
				Low	High	
	Low	*High*				
Wheat	$1.37/ bu.	100% of parity	$4.83/ bu.	$1.37	$4.83	$1.50
Corn	1.10/ bu.	90% of parity	$3.31/ bu.	1.10	2.98	1.25
Sorghum[2]	[3](Set at such a level as the Secretary determines is fair and reasonable in relation to corn considering feeding value and various other factors)					1.19
Barley[2]						1.02
Oats[2]						.60
Cotton[4] (upland)	[3](Loan rate will be 90% of average world price for American cotton for last 3 years unless current world prices are lower)		79.98 cents/lb.			37.12
Cotton[4] (Extra Long Staple)	150% (of upland cotton rate adjusted to average micronaire measure)	200%	$1.20/ lb.	.557	.732	.734
Soybeans	0	90% of parity	7.35/ bu.	0	6.62	2.50
Milk (all)	---	---	12.10/ cwt.			
Milk (mfg.)	75%	90% of parity	10.16/ cwt.	7.62	9.14	[5]8.13

[1] Parity prices are computed using the Parity Index (1910-14) for the month immediately preceding the first month of the marketing year for each commodity: corn, September; wheat, May; cotton peanuts, and rice, July; milk, March. (Revision of 1976.) Parity prices for commodities with marketing years after June projected. [2] Relative to corn, values are currently sorghum 95.0%, barley 91.43%, oats 48.57%. [3] Source: *Compilation of Statutes*, Agr. Hdbk. 476, Agr. Stabiliz. and Conserv. Serv., U.S. Dept. Agr., Jan. 1975. [4] Must be announced by November 1 of preceding year. [5] Reviewed quarterly.

DEFICIENCY PAYMENTS

Deficiency payments are based on the differential between the target price and the market price, multiplied by the farm's normal production—price differential times "normal" yield times allotted acreage. These payments are made to producers if market prices for the specified commodities in the first 5 months of the marketing year (for cotton, weighted calendar year price) fall below target prices.[2] The maximum deficiency payment is the amount by which the target price exceeds the loan rate. No deficiency payments were made in 1974 or in 1975.

Summarized in table 4 are hypothetical deficiency payments for 1976, with assumed 5-month average market prices of $2.04 and $1.75 per bushel for wheat and corn, respectively, a weighted calendar year price of 42.20 cents per pound for upland cotton, and target prices from table 2.

[2]Sorghum and barley target prices are based on corn equivalent value. Marketing years for the specified crops are: wheat June 1; corn and sorghum, October 1; barley June 1. (For the 1974 and 1975 crops, the marketing years for wheat and barley began on July 1.)

Table 4—Illustration of deficiency payments

Commodity	Farm allotment[1]	Normal yield	Normal production	Deficiency payment	Farm payment
	Acres	*Bu./acre*	*Bushels*	*Dollars*	*Dollars*
Wheat	100	20	2,000	[2].25	500.00
Corn	100	100	10,000	[3]None	None
		Lb./acre	*Pounds*	*Cents*	
Upland cotton	100	400	40,000	[4]1.0	400.00

[1] Under current programs, production is not restricted to allotments, but only production from allotted acreage is eligible for deficiency payments. [2] $2.29 minus $2.04= $0.25. [3] $1.57 minus $1.75 = 0.0 since market price exceeds target price. [4] 43.20 cents minus 42.20 cents = 1.0 cent.

DISASTER PAYMENTS

Target prices are also used in determining payments when natural disasters prevent producers from planting a portion of their allotment (or other substitutable crops) or from harvesting at least two-thirds of their normal production. The rate of payment for disaster protection is the larger of the deficiency payment rates or one-third of the target price.

Table 5 gives the estimates of disaster payments by crop and type of disaster in 1974, and 1975 through May 31, 1976. Extreme weather conditions prevailed in 1974 and this level of expenditure ($557 million) is not expected to be required in years of more normal weather For the 1975 crop, through May 31, 1976, disaster payments totaled $282.4 million (feed grains, $114.2 million; wheat, $51.1 million and cotton, $117.0 million).

Table 5—Feed grain, wheat, and cotton disaster payments for 1974 and 1975

Item	Feedgrains	Wheat	Cotton	Total
		Number		
1974:				
Farms	263,795	117,083	81,787	321,506
Payments:		*Dollars*		
Prevented planting	12,425,621	2,939,831	19,915,484	35,280,936
Low yields[1]	315,372,255	98,538,023	107,876,674	521,786,933
Total	327,797,876	101,477,904	127,792,158	557,067,875
1975[2]:		*Number*		
Farms	99,259	38,599	55,791	181,845
Payments:		*Dollars*		
Prevented planting	1,497,676	594,888	19,093,022	21,185,603
Low yields[1]	112,713,752	50,547,373	97,929,018	261,190,140
Total	114,211,428	51,142,267	117,022,055	282,375,729

[1] Low yields arising from a number of natural causes which prevented harvested production from yielding at least two-thirds of the normal amount. [2] As of May 31, 1976.

SOME ECONOMIC IMPLICATIONS

The main objective of loan rates and target prices is to ensure farmers a viable return for their productive efforts. There is, however, a significant difference in the impacts on agriculture.

THE LOAN RATES

The loan rate effectively serves as a floor under the market price. If the market price temporarily falls

below the loan rate, farmers will not redeem their CCC loans and little agricultural production will be placed on the market. Consequently, the market price tends to remain at or above the loan rate. In recent years market prices have been well above the loan rates, with little or no impact on crop production or marketing. During the 1960's however, the market prices for some grains were buttressed by the loan rates.

When it effectively supports the market price, the loan rate has several economic consequences. First, farmers who raise crops with effective loan rates benefit by receiving a higher price and an interest-free loan on the crop. Domestic and foreign purchasers pay this higher price (higher than the equilbrium market price), and taxpayers bear the program's operating costs (interest-free loans, administrative costs, etc.).

Second, when the price is higher and risk is reduced because price levels are known and certain, farmers tend to increase production of crops with effective loan rates. The result is a shift of resource use to such crops away from other agricultural production and from nonfarm production. For example, increased loan rates on corn could raise its price, resulting in higher feed costs for livestock and reduced livestock production.

Producers of the crop with the effective loan rate will be willing to bid up the price of resources used in its production. This process holds marginal resources in agriculture, rather than reducing their use or transferring them to more efficient uses in the nonagricultural sector.

TARGET PRICE-DEFICIENCY PAYMENT

When the target price is effective, farmers receive a direct Government payment—a transfer payment from taxpayers to agriculture. Unlike the loan rate, the level of target prices and the expected size of the deficiency payment have little if any direct impact on the market price for crops other than cotton. Consequently, they need not influence the mix of crops a farmer chooses to plant, since what he plants in a given year has no impact upon the size of that year's deficiency payment. Cotton producers must plant 90 percent of their allotment to be eligible for the full payment. Thus, use of support payments could hold resources in cotton.

For example, the wheat deficiency payment computation shown earlier in the article does not include the actual amount of wheat grown on the farm in the current year. The farmer need not grow any wheat to receive such a payment. Also, the farmer's wheat acreage could greatly exceed his allotment but that would not increase his deficiency payment.

In essence, the farmer could have chosen to plant any combination of crops and this choice would have had no impact on the size of deficiency payment for that year. Of course, the actions of all farmers in the aggregate will influence the market price and potential payment rate. Currently, farmers would not lose their allotment if they did not plant the specific crop and if they shifted to other crops. Legislation protects their allotment by allowing specific substitute crops.

Further, if farmers expect significant deficiency payments in the future, they will build that expectation into the prices they are willing to pay for land containing allotments. Eventually, as demand increases, the price of land is bid up. Thus, the benefits of deficiency payments eventually go to the owners of the cropland containing allotments. If large payments are expected, the capitalization into land values will be large. If small amounts are likely, capitalization will be small.

The loan rate gives individual farmers income protection through the marketplace by putting a floor under the price for the crop. The loan program thus affects the mix of products produced; resources used; and returns to inputs, such as land and the operator's labor and management. Consequently, the program tends to increase the value of the inputs.

The target price-deficiency payment protects farmers' income through Government payments. The size of the payment in any 1 year is mostly beyond the control of the individual farmer; it is determined rather by national price relationships and the historical distribution of allotments.

TARGET PRICES FOR OTHER CROPS

The extension of the target price-deficiency payment concept to other crops and livestock has been suggested from time to time. Soybeans are an obvious candidate, ranking third behind corn and wheat in acreage grown, and competing with corn in the Midwest and cotton in the South. During the 1960's soybean plantings expanded rapidly on cropland diverted from feed grains wheat, and cotton by the production adjustment programs. Soybean acreage more than doubled between 1960 and 1973. But in the last 3 years, with no production controls on other crops, its acreage has declined. Extension of the target price concept to soybeans would necessitate establishment of allotment and yield records for producing farms.

The target price concept for crops might also have application to livestock. Agricultural production is becoming more specialized; many farmers are specializing either in crops or livestock, but not both. Specialized livestock producers do not receive the income protection of a target price program. For target prices to be applied to livestock, a production base analogous to the allotment and established yields for crops would need to be defined for each of the types of livestock covered.

USE OF LAND RESERVES IN AGRICULTURAL PRODUCTION ADJUSTMENT

By
Milton Ericksen*

ABSTRACT

A land reserve program is one instrument for achieving production adjustment. But the results of past programs have been less than expected because of "slippage." This term refers to the proportion of acreage put into a reserve for which there is no corresponding reduction in production of the crops being controlled. Slippage coefficients in land reserve programs during 1956-73 usually ranged between 0.4 and 0.5, implying a program efficiency rate of only 50-60 percent in reducing acreage. Acreage put into land reserve also tends to be less productive than acreage being cropped, thus further reducing program production abatement.

A land reserve program which would link base acreage to the previous year's crop acreage is discussed. Land reserve acres would be required to come from the land actually used for production of the controlled crop in the previous year.

One problem of such a plan would be that income supplements tied to annually updated bases might be an incentive for producers not to participate in the program for a year to establish a large base. The probability of this response would be decreased if income supplements were variable annually.

KEYWORDS: Land reserve, acreage reserve, production adjustment, slippage, agricultural and food policy.

INTRODUCTION

For 18 consecutive years, 1956-73, varying amounts of U.S. cropland were idled from the production of farm commodities. Terms for specific programs or particular provisions of commodity programs have included soil bank, acreage reserve, conservation reserve, cropland adjustment, cropland conversion, diversion, and set-aside. The amount of cropland idled under these various programs exceeded 60 million acres in 1962, 1966, and 1972. The set-aside provisions of agricultural programs in effect since 1973 have not been used.[1]

The major purpose for the land idling programs and provisions was to reduce the production of wheat, feed grains, and cotton. The acreage reserve, diversion, and set-aside programs were annual programs wherein the land withdrawn was committed to nonproduction use for 1 year at a time. The other programs allowed longer term commitments, ranging up to 10 years; and in some cases, they allowed whole farms to be retired. While these longer term programs were primarily aimed at reducing crop production, a secondary objective was to promote permanent conversion from crop use to pasture or forest uses, especially in cases where the land was marginally suited for grain crop use.

The purpose of this report is to examine the effectiveness of land reserve programs in reducing crop acres and to relate the effectiveness to the underlying mechanism for administering the programs. The slippage problem is treated first, followed by a discussion of rigidi-

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[1]Some land contracts under the cropland adjustment program were not due to expire until after 1974. But, after 1973, farmers were allowed to break the contract if they wished. Approximately 2 million acres remained under contract in 1974.

ties in production adjustment introduced by allotments and bases. An alternative plan for administering land reserve programs is suggested and briefly elaborated.[2]

Information in this report may be pertinent if future conditions require policymakers to again consider land reserve as a policy instrument to effect production control. Treatment of this topic does not imply that use of land reserve is superior to other instruments for effecting supply control nor does it imply that some form of supply control may be needed in the future.

THE SLIPPAGE ISSUE

SLIPPAGE CONCEPTS

"Slippage" is a term often discussed in connection with the performance of land reserve in achieving the supply objective. Slippage refers to the proportion of acreage put into a reserve for which there is no corresponding reduction in production of the crops being controlled. The following examples show how slippage occurs in acreage and in production.

Let A_1^h* represent the acreage of crop 1 that farmers would harvest under a given set of program provisions without land reserve. Let A_1^h represent the actual acreage of crop 1 harvested under the same program with land reserve. Let L_1 equal the acreage of land designated as crop 1 land reserve. Slippage of harvested acreage for crop 1, S_1^h, is defined as:

$$S_1^h = 1.0 - \left[(A_1^h* - A_1^h) \div L_1 \right] \qquad (1)$$

If $S_1^h = 0$, it means that crop acreage was reduced by 1 acre for each acre of land reserve, L_1. If $S_1^h = 1$, it would mean that the land reserve had no effect on the acreage of the crop.

Now let Y_1^h* be the yield that would have resulted with A_1^h* acres and Y_1^h be the actual harvested acre yield. Under these conditions, production slippage. S_1^p, for crop 1, would be defined as:

$$S_1^p = 1.0 - \left[[(A_1^h* \cdot Y_1^h*) - (A_1^h \cdot Y_1^h)] \div [L_1 \cdot Y_1^h*] \right] \qquad (2)$$

The objective of land reserve programs is to control production by limiting the land input, thus the reason for the definition of slippage on the basis of production. When production slippage is greater than acreage slippage ($S_1^p > S_1^h$), the land placed in land reserve may be less productive than the land remaining in production of crop 1. Another yield-related factor is that yields may increase ($Y_1^h > Y_1^h*$) because farmers apply inputs more intensively to the remaining land they are allowed to use for production. Values for S_1^h, and S_1^p cannot be readily estimated because values for A_1^h* and Y_1^h* are not known. Estimates of A_1^h, Y_1^h, and L_1 are available only when a land reserve program is in effect.

Slippage equations (1) and (2) are developed on the basis of total acreage of crop 1, when, in practice, land reserve occurs only on participating farms which represent some fraction of the total. A slippage coefficient calculated on the basis of participants only may be different from one calculated for all farms. Nonparticipating farmers may believe the existence of a land reserve program has a positive influence on expected price of the particular commodity. Therefore, they may increase their acreage of the crop in response to a land reserve program. If this response occurred, the slippage coefficient for all farms would be greater than the coefficient for participating farms only.

Slippage was defined for one crop in equations (1) and (2). A land reserve program aimed at a particular crop may affect other crops that may or may not have separate land reserve programs. For instance, the value of A_2^h* for crop 2 may differ from the value of A_2^h when there is a land reserve program for crop 1. Such a difference indicates a cross effect.

A slippage coefficient for net harvested acreage can be defined by looking at the total land reserve acreage and the total acreage of all crops as defined in the following equation:

$$S^h = 1.0 - \left[\left(\sum_{i=1}^{n} A_i^h* - \sum_{i=1}^{n} A_i^h \right) \div \sum_{i=1}^{n} L_i \right] \qquad (3)$$

A net production slippage coefficient is not defined in this report because of the difficulty of summing across different commodities.

It is evident from observation of farm program performance with respect to land reserve programs, that slippage coefficients as defined in equations (1), (2), and (3) have a positive value. A positive slippage value is viewed as undesirable for two reasons.

First, acreage in land reserve status may be viewed as an intermediate-term food reserve by policy planners, domestic consumers, and foreign customers. It is quite tempting to assume that each land reserve acre for crop i can provide a future production increment, if needed, equal to an acre producing crop i. If there is a large production slippage coefficient, the actual reserve may be much less than the implied reserve, thus resulting in a false sense of security.

[2]The term "land reserve" is used here to describe land withheld from production through programs whose primary objective is supply reduction.

Second, from the individual farmer's standpoint, the existence of positive slippage coefficients means that some farmers' levels of program performance do not meet with the intent of the provisions. Farmers whose situation results in slippage can usually meet the land reserve requirements without having to reduce the acreage of their most profitable crop proportionally to the required land reserve acreage. Slippage as discussed here is not a result of fraud or willful disregard of rules, but rather bona fide situations that result within program provisions rules. The results: not only do farmers receive production adjustments payments for less than full performance but also the purpose of the program in the aggregate tends to be defeated. Inequity occurs among farmers because not all farmers have situations conducive to slippage. Also, cost effectiveness of the program may be reduced from what it could have been under conditions of no slippage.

ESTIMATES OF SLIPPAGE

Garst and Miller published an analysis with objectives of developing a predictive model for the planted acreage of wheat and obtaining a statistically accurate estimate of the impact of changes in land reserve acreage on the acreage of wheat planted (*3*, p. 30).[3] They concluded that, during 1961-70, each acre of additional land reserve (diversion) reduced total wheat plantings about 0.61 acre. During 1971-73, each acre of wheat land reserve (set-aside) reduced planted acreage of wheat 0.41 acre (*3*, p. 36).

These reported measurements reflect the concept of equation (1) above, except that their measurements are in planted rather than harvested acres. Ignoring this difference, slippage coefficients would equal 0.39 and 0.59 for 1961-70 and 1971-73, respectively.

Sharples and Walker reported results from an analysis designed to account for the impact of two major factors on planted acreage in the North Central Region,[4] change in crop rotations over time, and cropland diversion. The overall purpose was to make shortrun predictions of planted acreage of row crops (corn and soybeans) and of extensive crops, given various levels of land reserve acreage (*5*, p. 106). They reported the following predictive equation estimated from 1961-72 data (*5*, p. 109):

$$Y_r = 84{,}184 - 22{,}746\,(0.8748)^T - 0.621\,(DVRN) + 1260\,(CFP)$$

where: Y_r = planted acres (in thousands) of row crops (corn and soybeans)

T = time expressed as 1961 = 1, 1962 = 2, ... 1972 = 12

DVRN = Acreage (in thousands) of wheat, feed grain, and cotton diverted

CFP = a zero-one variable representing change of farm programs in 1971 that eliminated planting restrictions on individual crops (1961-70 = 0, 1971-72 = 1)

Their predictive equation shows that each land reserve acre reduced the acreage of row crops by 0.621 acre. The bulk of the land reserve resulted from the feed grain program in the North Central area. Thus, the fact that wheat and cotton acreages were not included in the dependent variable, Y_r, but were included in the land reserve data would have little effect on the land reserve coefficient. The implied slippage coefficient would be 0.379. Less slippage would be expected in the North Central region compared with other U.S. regions because the North Central region has virtually no fallow land and it has a much higher percentage of land in farms classified as cropland than do other regions.

Sharples and Walker estimated a similar equation for extensive crops (oats, wheat, barley, rye, flax, and hay). The DVRN variable had a coefficient of -0.124, indicating that land reserve also had some effect on these crops (*5*, p. 109). The sum of the two DVRN coefficients is 0.745. Slippage in the sense of equation (3) for all crops would be 0.255.

Houck and Ryan, in a report on the supply analysis of corn, defined a diversion variable that combines diversion payment rates and eligible diversion acreage. They used this variable as an independent variable in an equation to explain diversion, and the same variable in an equation to explain the planted acreage of corn. The coefficient for this variable was, they noted, about twice as large in the diversion equation as in the planted acreage equation (*4*, p. 190). They appraised this difference as resulting from slippage, implying a slippage coefficient of roughly 0.5. Set-aside program years were not included in the analysis.

From an unpublished analysis of factors affecting the cropland acreage farmers use for crops, some additional insights emerge as to the magnitude of slippage (*1*). Cropland used for crops is defined to be the total acreage of cropland harvested plus the acreage of crop failure and the acreage of fallow land. To define the total cropland inventory, two additional categories must be added to cropland used for crops: (1) soil improvement crops and idle cropland, and (2) cropland pasture.[5] Land reserve acreage should, by definition, be reflected as an addition to the soil improvement crops and idle cropland category and, conversely, as a direct acreage reduction in the cropland used category.

Through use of data for 1937-73, the following equation was estimated (*5*):

$$L_t = 346.8 - \underset{(.002)}{0.60}\,D_t + \underset{(.066)}{0.29}\,PR_{t-1} \quad R^2 = 0.95$$

where: L_t = total cropland used for crops (cropland harvested + crop failure + fallow), year t.

[3]Italicized numbers in parentheses refer to items in References at the end of this paper.

[4]Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin.

[5]See (*1*, p. 2) for breakdown of major land uses in the United States.

D_t = land in acreage reserve programs (includes both annual and long term programs), year t.

PR_{t-1} = the average annual parity ratio for the preceding year.

The numbers in parentheses are the standard errors of the estimated coefficients.

The model formulation uses the assumption that farmers plan their production response, including cropland use, based on expected returns. The parity ratio is the ratio of the indexes of prices received to prices paid; it measures the purchasing power of products sold by farmers in terms of things they buy compared with a base period. This variable lagged 1 year is used as an estimate of farmers' expectations for net returns for the current year. The land reserve variable picks up the effect that idled acreage has on cropland acres independent of net return expectations.

The estimated model equation explains a large percentage of the variation in total cropland used for crops. This model also reflects the slippage concept illustrated by equation (3) above. The implied slippage coefficient is 0.4.

Another indication of slippage is suggested by occurences since 1973. When set-aside requirements were reduced in 1973 and eliminated in 1974, the acreage of feed grains, wheat, and soybeans which were in short supply did not increase proportionally to the acreage reductions in land reserves. In 1972, 230.9 million acres were planted to the seven major crops and 61.5 million acres were listed as idled by land reserve. In 1975 no land reserve provisions were operative, yet the increase in planted acreage of the seven major crops was only 31.0 million acres, or about half the acreage put into reserve in 1972. Commodity prices had substantially increased during this period, some to record levels, providing an added economic incentive for increased production.

These last two measures of slippage indicate that it is associated with total cropland as well as with individual crops. Use of land reserve has failed to remove a proportional acreage from crop production regardless of whether the consideration is for specific crops or crops in general.

Slippage will vary by year, crop, and region, and it will also be affected by different programs. Knowledge of how land reserve provisions are applied and use of simple reasoning indicate that the acreage level of land reserve also affects the slippage coefficient. Slippage would be largest with small land reserve requirements and it would decrease as the total acreage of land reserve is increased. This statement follows simply because, if the land reserve requirement is large enough, a farmer would be forced to reduce acreage of major crops by 1 acre for each additional acre of land reserve. Slippage coefficients for individual crops are greater than coefficients for a group of crops or for cropland used for crops.

The empirical evidence available indicates that, on the average, past land reserve programs have been only 50 to 60 percent effective in reducing crop acreage from what that acreage would have been had no land reserve provisions existed. Relatively, wheat programs have resulted in more slippage than have feed grain programs. Shifting the concept of land reserve from diversion to set-aside increased the slippage problem.

PRODUCTIVITY OF LAND RESERVES

A study published in 1969 of the productivity of diverted cropland concluded that the productivity of diverted acreage as a percentage of acreage in production reached 90 percent for wheat, 85 percent for grain sorghum, 83 percent for barley, 82 percent for corn, and 80 percent for cotton (*8*, pp. 14-15). This behavior constitutes a slippage factor in addition to the acreage slippage discussed above. Equation (2) illustrated a slippage concept that includes yield (productivity).

No studies were found that examined how nonparticipants adjust when participants maintain land reserve acres. Their behavior, if it follows that suggested earlier, would also affect slippage.

REASONS FOR SLIPPAGE

Why does slippage occur? A definitive answer would require careful study of annual program provisions and how these provisions apply on individual farms. Obvious observations can be made, however. Land normally not counted as part of the cropland inventory may qualify as land reserve acreage. In this case, available cropland acreage is not reduced proportionally, which allows crops other than those with acreage maximums to continue to be grown.

Many farms have land in the cropland inventory that is regularly left idle after planting. Fallow land is an obvious example but there are other situations, such as flooding, high water tables, alkaline soil conditions, small isolated tracts, and high incidence of crop failure in drought-ridden areas. Designation of land regularly idled anyway as land reserve will not affect final crop acreage. One reason a large slippage coefficient is associated with wheat is that land fallowed under normal circumstances has qualified as land reserve, resulting in no net effect on final wheat acreage.

BASES AND ALLOTMENTS AND PRODUCTION RIGIDITIES

Most U.S. farms have allotments, bases, or both, assigned to them depending on historical cropping patterns. To maintain the assigned level of the allotment or base, farmers have generally been required each year to maintain an acreage of the allotment or base crop that reaches at least 90 percent of the allotment or base. Most farmers have tried to maintain their allotment or base acreages because income support payments are directly related to these acreages.

The acreage of land to be idled under annual land reserve provisions has historically been calculated as a percentage of the particular base or allotment assigned to a farm. When marketing quotas are in effect, the allotment becomes the upper limit on acreage for the particular crop for all farmers. Under voluntary programs, only participating farmers are limited to planting within their allotment or base acreage.

The required planting provisions tended to lock in production patterns, which may have led to production inefficiencies as price relationships and technical possibilities changed over time. In 1964, substitution provisions for wheat and feed grains went into effect. These allowed farmers with both a wheat allotment and a feed grain base to plant either wheat or feed grains on both acreages, to "preserve production history." Farmers still had to plant within the total of the base and allotment if they were participants. The Agricultural Act of 1970 introduced the set-aside concept, which removed the upper acreage limits. In place of upper limits, set-aside relied only on the maintenance of the conserving base acres plus a set-aside land reserve as the production control mechanisms. Bases and allotments still had to be planted to specific crops or designated substitutes to "maintain production history." The Agriculture and Consumer Protection Act of 1973, which continued the set-aside concept, included cotton in the substitution provisions, and it also added a list of other crops that could be substituted. In comparison with past programs, the 1973 act provided producers more freedom in decision-making as to the mix of crops that could be grown.

CONSERVING BASE

The conserving base is yet another base assigned to farms, based on historical land use, that is important in understanding and evaluating land reserve programs. The conserving base applies to crops that conserve the soil as opposed to crops that deplete it. Although justified on the basis of soil conservation, the conserving base also acts as a program provision factor in production control. Typically, it reflects a historical acreage of fallow land, cropland pasture, tame hays and forages, soil improvement crops, and idle land.

Whenever land reserve provisions have been in effect, farmers have been required to maintain an acreage of soil-conserving crops equal to their assigned conserving land base, in addition to any land reserve acreage. The requirement to maintain the conserving base was instituted to prevent farmers from reducing conserving crops to meet land reserve requirements or, conversely, to prevent farmers from reducing conserving crops to maintain the acreage of major crops which were under production control.

As with other bases and allotments, use of the conserving base tended to lock in production patterns on farms, which could have caused production inefficiencies as price relationships and production techniques changed. This rigidity was recognized and conserving bases were reduced over time.

Sharples and Walker, as already noted in the study discussed above, reported a predictive equation for estimating the acreage of extensive crops (*5*, p. 109):

$$Y_e = 25{,}167 + 26{,}828\,(0.9276)T - 0.124\,(DVRN)$$

where: Y_e = planted acres (in thousands) of extensive crops[6]

T = time expressed as 1961 = 1, 1962 = 2, ... 1972 = 12

DVRN = wheat, feed grain, and cotton diverted acres (in thousands)

As shown by the equations, non-row crop acreage in the North Central region declined over time, mainly in hay and oats. Hay is a conserving base crop; oats may have been considered, historically, a conserving base crop, depending on how they were harvested locally. The shift from extensive to intensive crops, as measured by Sharples and Walker, parallels the reduction in the conserving base. Their equations illustrate another point in connection with slippage. Besides showing the slippage involved with land reserve acres for each year, the equations also indicate that a given level of land reserve in 1972 controlled intensive program crops less effectively than the same acreage had done in 1961. Further, the intensive crop equation, through the CFP variable, shows the effect of changing to the set-aside concept of land reserve in 1971. The land reserve acreage (DVRN) would have to be increased 2.0 million acres after 1970 (1.26 million ÷ 0.621) to offset the structural program shift.

In conclusion, there has not only been slippage for any given year but also a loss of effectiveness over time in the ability of land reserve acreage to control acreage of surplus production crops.

The use of substitute crop provisions, the shift to the set-aside concept, and the reduction in the conserving base have substantially reduced the production pattern rigidities imposed by the historical bases and allotments. Provisions to reduce the rigidity problem contributed to the slippage problem.

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[6]Oats, wheat, barley, rye, flax, and tame hay.

COMPARISON OF CROPPING PATTERNS WITH BASES AND ALLOTMENTS

Another problem with the historical bases and allotments is that income support payments, such as deficiency payments, are based on bases and allotments. Thus, a farmer can receive a payment based on a crop that is no longer a major crop nor one even grown on the farm. If the policymakers' intent is to associate payments with a particular crop (whether these payments are income support or compensation for production adjustment), relaxation of the association between a base and allotment and a particular crop could pose difficulties in administering a program, especially if the program is aimed at a particular crop.

The following table contains statements based on 1973 participant data that indicate the difference between cropping patterns and the assigned bases and allotments (*7*, pp. 168-169 and 264):

	Difference between cropping patterns and assigned bases and allotments
Corn	Farms with corn base had 77.0 million acres of base and planted 56.1 million acres of corn. 35 percent of the farms with corn base planted no corn. Those farms had 11.9 million acres of corn base. The corn base was overplanted by 200 percent or more on 3.3 percent of the farms. Those farms had 1.3 million acres of base and planted 3.8 million acres of corn.
Grain sorghum	Farms with grain sorghum base had 21.8 million acres of base and planted 14.9 million acres of grain sorghum. 48 percent of the farms with a grain sorghum base planted no grain sorghum. Those farms had 6.7 million acres of base. The grain sorghum base was overplanted by 200 percent or more on 7.1 percent of the farms. Those farms had 664,000 acres of base and planted 3.7 million acres of grain sorghum.
Barley	Farms with a barley base had 15.3 million acres of base and planted 7.9 million acres of barley. 67 percent of the farms with barley base planted no barley. Those farms had 6.9 million acres of base. The barley base was overplanted by 200 percent or more on 4.9 percent of the farms. Those farms had 530,000 acres of base and planted nearly 1.8 million acres of barley.
Wheat	Farms with domestic wheat allotment had 17.8 million acres of allotment (the domestic allotment is roughly one-third of the total wheat allotment) and planted 49.7 million acres of wheat. 45 percent of farms with wheat allotment planted no wheat. Those farms had 2.6 million acres of allotment. The wheat allotment was overplanted by 400 percent or over on 16.9 percent of the farms. Those farms had 3.8 million acres of domestic allotment and planted 21.4 million acres of wheat. (Farmers would normally overplant the domestic allotment by a factor of 3, if allotments and plantings were completely consistent.)
Cotton (based on 1972 data) (*6*, p. 437)	Farms with cotton allotment had 10.2 million acres of allotment and planted 13.8 million acres of cotton. Only 1.3 percent of farms with cotton allotment planted no cotton. Those farms had 31,000 acres of cotton allotment. The cotton allotment was overplanted by 200 percent or more on 9.2 percent of the farms. Those farms had 866,000 acres of allotment and planted 2.4 million acres of cotton.

A LAND RESERVE PROGRAM

If future supply and demand conditions require the use of land reserve to control supply, the problem of slippage will be encountered, should provisions be structured as they were during 1956-73. The rigidities involved in the use of historical bases and allotments have been reduced, but, as a consequence, base and allotments may no longer be related to production patterns that now exist on individual farms. A way to redefine crop bases and administer a land reserve is developed below. It attempts to reduce both the slippage and rigidity problem.

ASSUMPTIONS

A voluntary land reserve program would be implemented annually, as needed, to selectively reduce the production of commodities that have a potential surplus. Land reserve provisions should be designed to minimize slippage and to maximize efficiency of production on nonreserve acres. Acres idled with minimum slippage would reflect a potential intermediate-term commodity reserve more accurately. The cost effectiveness would

more nearly reflect the desired mix of production adjustment payments and income supplement payments (if any).

Crop bases are needed to establish a reference point for determining the level of land reserve required of each participant as a fair share of the total land reserve requirement. Bases may also be used for allocation of support payments.

This proposal modifies the procedure for setting historical bases and allotments and eliminates the conserving base. A farm's production pattern the previous year would be the base for making production adjustments in the current year. The production pattern for each farm would be reported annually by the farmer to the county Agricultural Stabilization and Conservation Service (ASCS) office.

If program administrators determined that a land reserve was needed, participating farmers would be required to limit their acreage of the specific crop to a certain percentage of their base. The base would be last year's acreage. In addition, participants would be required to certify an acreage of land reserve equal to the difference between the base acreage and the allowed planting. An upper acreage limit would be set as a percentage of the base and a percentage of the base would be devoted to the land reserve. The two percentages would add to 100.

A further requirement would be that the land reserve acreage be on land that had been planted to the controlled crop in the previous year. The crop base for a controlled crop for the next year would be the planted acreage plus the land reserve in the current year.

The proposed method of redefining crop bases does not relieve the program administrator of the task of determining the expected participation rate for the program announced. The base is last year's planted acreage, or planted acreage plus land reserve if a land reserve program had been in effect.

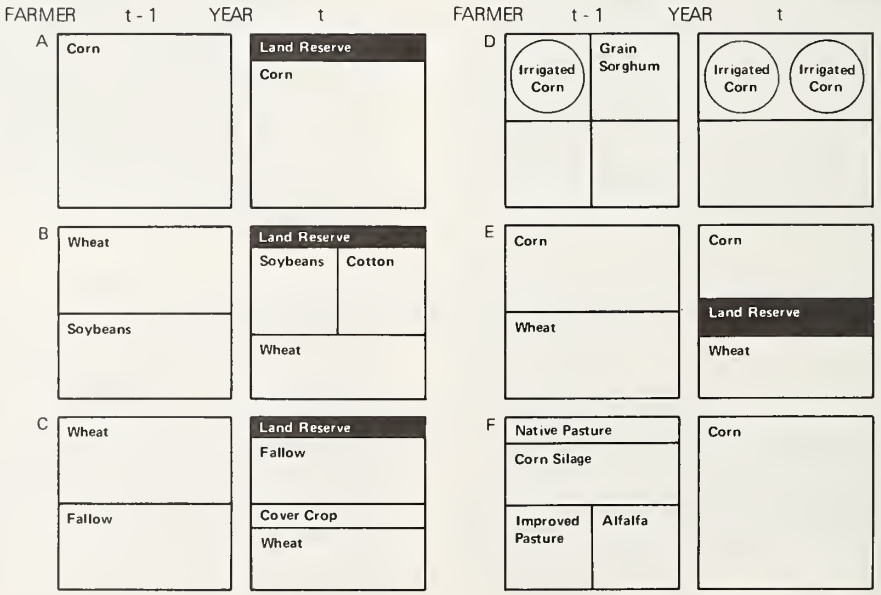
Obviously a high participation rate makes a program's effect more predictable. A low participation rate requires participants to make larger adjustments. It also makes the program effect harder to predict because of the adjustments nonparticipants may make in response to the program. Achieving higher voluntary participation rates requires greater economic incentives. Kinds and levels of incentives are not considered in this paper.

EXAMPLES

Six hypothetical farms are depicted in the figure to illustrate the method. Participants are required to limit corn acreage to 85 percent of their corn base and wheat acreage to 75 percent of their wheat base. Conversely, land reserve requirements are 15 and 25 percent of the corn and wheat bases, respectively.

Farmer A participates and puts 15 percent of the corn

HYPOTHETICAL FARMS USING PROPOSED LAND RESERVE PROGRAM



land into land reserve as required. A's corn base for year t+1 would be the same as for t. Farmer B participates and puts 25 percent of the wheat land in land reserve. The land reserve is placed on base wheat land and the acreage of wheat plus land reserve does not exceed the base acreage. An additional requirement that would logically be imposed is that a participating farmer such as B who did not have a corn base would not be able to grow corn in year t if corn production was also under production controls. B could grow a noncontrolled crop such as cotton (see figure), establishing a cotton base for year t+1. B could also grow corn if he were a nonparticipant. Wheat, soybeans, and cotton could be grown anywhere on B's farm.

Farmer C operates a wheat-fallow rotation. If participating, C would be required to have a land reserve on the land in wheat in year t-1. C could not harvest an acreage of wheat plus land reserve in year t that would exceed the wheat base established in year t-1. The land fallowed in year t-1 would have to be planted to a cover crop in t. The cover crop might be wheat, but C would have to certify in some way that he did not harvest the cover crop portion; that is, clip the heads before they ripen or till the cover crop land before the wheat ripened.

Farmer D's corn base would equal one-fourth of the cropland based on his organization in t-1. Suppose D wanted to install another center-pivot irrigation system in order to double his corn acreage. By not participating in year t, D could expand his corn acreage and increase the base commensurate with the desired production plan. D could also eliminate wheat from the cropping plan and switch to grain sorghum. D reports year t organization to ASCS and he would be eligible to participate in any program in year t+1. Under the existing base and allotment system, D would likely have a feed grain base, a wheat allotment, and a conserving base. These bases and allotments would no longer fit his desired organization. If participating in a program using the historical allotments and bases, D would either be forced to adjust his organization to conform more closely with the historical bases and allotments or else D would be receiving payments based on a crop he no longer grows. Under the method proposed here, D would be able to adjust his organization and bases by being a nonparticipant for 1 year at most. Or, if no production adjustment provisions had been in effect in year t, Farmer D could have adjusted bases without foregoing any possible benefits.

Another logical regulation would require a farmer growing two controlled crops (Farmer E) to either establish a land reserve for both crops or else not participate.

A farmer may desire to shift from a livestock operation, such as dairy farming, to a crop operation. Farmer F would likely have had a small feed grain base, a very large conserving base, and an acreage of tillable native pasture. In year t, F sells the herd and switches to a corn-for-grain organization. F could do this, report corn acreage, and establish a corn base for year t+1. F would be adding land to the cropland base.

EVALUATION

Such a method of setting bases and of controlling production through use of a land reserve should minimize interference with producer response to market signals. When needed, production control can be accomplished through a level of reserve in which the reduction base comes from the most recent level of resource allocation. Farmers always have the option of readjusting their production base to conform to their interpretation of market signals. They may have to forego program participation for 1 year but they incur no longrun penalty for making the adjustment, such as a permanent loss or reduction of an allotment or base.

Use of historical bases and allotments year after year has been justified as a way to channel benefits to farmers and to areas that had a cropping history and to prevent farmers with no production history from acquiring a base or allotment to share in the program benefits. A farmer may have desired to grow a program crop based on resulting payment benefits rather than on production efficiency and effective market demand. In such a case, the argument for historical bases and allotments has validity. An argument against annual adjustments of bases would be less compelling if policymakers were to take the view that farmers should rely on the marketplace for their income and that payments should be compensation for voluntarily making adjustments, including an amount for participation incentive.

Another point to consider is whether annual adjustment in bases would cause farmers to distort their production patterns to try to adjust their bases to their own advantage. Ideally, the fact that a current year's acreage will be the next year's base would not affect the production pattern. However, the identity between acreage and base will most probably influence production patterns. The degree of influence will depend on the benefits that go with a base. Production distortions should be minimal if a base is used for production adjustment and the payment is adequate compensation for the adjustment. Farmers would certainly try to maximize their base if large income transfers were tied to the base. Or they would try to minimize their base if required adjustments were not fully compensated. The structure of the entire program would help determine how well annual adjustments in bases might work.

An "n" year moving average could be used to adjust bases. The acreage from the most recent year is added and the acreage from the most distant year is dropped from the averaging equation. This procedure would make base adjustments more gradual.

Reduction of slippage depends on inclusion of two requirements. Land reserve acreage must be allocated to land used to grow the crop in the previous year; and total acreage of the controlled crop must be limited. In one sense, these requirements introduce fairly rigid controls. Farmers would probably accept such measures only when their base acreages accurately reflected their desired organization.

CONCLUSIONS

Establishment of farm program bases, based on the previous year's organization, would be designed both to make production adjustments through land reserve more efficient by reducing slippage and also to minimize impediments to farmers who make desired organization adjustments. If most of the slippage could be eliminated from land reserve acres, these acres would be more representative of actual land reserve. Requiring land reserve acres to be on land actually used for the crop being adjusted in the previous year should assure that the productivity of these acres more nearly equals the cropped acreage than has been true in the past.

If large income supplements were to be tied to annually updated bases, there could be an incentive not to participate 1 year in order to establish a large base. This possibility would have to be considered. But it may be less of a problem if income supplements were to vary from year to year as they do under the current program, which involves deficiency payments. If payments were to vary, farmers would have to gamble that they would be large the year(s) following their adjustments. The expected payoff of obtaining a larger allotment may not be enough to justify foregoing a year's program benefits unless market expectations also indicate a need for adjustment of crop acreages.

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GRAIN RESERVES: PRICE INSTABILITY AND THE FOOD SUPPLY

By Jerry A. Sharples and Rodney L. Walker*

ABSTRACT

The rationale for holding grain reserves is given and methods of operating such a reserve are explained. A U.S. buffer stock of grain would lend considerable stability to world grain markets because the United States accounts for half the world's grain exports. Previous U.S. stocks largely resulted from commodity price support programs, whereas a buffer stock program's purpose would be to increase price stability.

Two types of rules—for price and quantity—are generally discussed and evaluated as methods for determining how and when to augment or decrease the reserve. A simplified form of buffer stock management rule is illustrated and its operation shown. The example highlights management issues, such as existence of price trends, differential between purchase and sale price, and adjustment of the buffer stock purchase and sale prices over time.

KEYWORDS: Grain reserve, buffer stock, price stability, stocks, market stability.

Public discussion of grain reserve stocks for the world started anew in 1972 as granaries emptied rapidly and prices rose. Numerous proposals were advanced for establishing a world grain reserve and rebuilding the U.S. domestic reserve. These proposals included such diverse objectives as: providing domestic and international grain market stability, providing food for victims of natural disasters, and using reserves as a foreign policy tool or a counter to cartels of countries that produce raw materials. The discussion continues, though now with less urgency, in the United States and in some international organizations. As public deliberation begins of legislation embodying U.S. agricultural and food policy, the issue of whether to establish a domestic grain reserve may emerge and it could be the focus of spirited debate. International discussion also continues, from impetus provided by the World Food Conference of November 1974.

Drawing upon results of recent research, we present a context in which to view some of the grain reserve issues and we review principles and concepts of operating a grain reserve. For a discussion of an international reserve, see (*9* and *3*).[1] In our article, we examine arguments for and against a Government-controlled grain reserve, discuss operating principles of a domestic grain reserve, and present performance evaluations and costs of a reserve.

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[1]Recent reports treating domestic reserves include (*6*, *2*, *8*). Italicized numbers in parentheses refer to items in References at the end of this article.

RATIONALE FOR A U.S. GRAIN RESERVE

Grain reserves, whether publicly or privately held, are usually proposed to achieve two broad objectives: to be available in emergencies for humanitarian purposes at home and abroad, and to add stability to farm product and food prices.

HUMANITARIAN OBJECTIVE

A long-held U.S. policy has been to provide food assistance to other nations, when disasters such as floods, drought, and earthquakes disrupt the normal food supply. A grain reserve for this purpose reflects a basic desire to help people prevent starvation and it cannot easily be analyzed in an abstract, quantitative way. Such an objective, arising from concern for fellow human beings, is largely voiced in circles which advocate a world grain reserve. While this objective cannot be directly analyzed in an economics context, it cannot be ignored.

MARKET STABILITY OBJECTIVE

A second principal objective offered for a domestic reserve is to reduce grain price instability. Two main sources of that instability are production variability in the United States and foreign demand for U.S. grain.

A major source of instability in the U.S. grain market is the variability in annual production. Since 1950, cereal production has increased an average 4.4 million tons annually but the annual deviation from trend has averaged 10 million tons per year.[2] In 1974, for example, production declined 33 million tons (14 percent) from the previous year, but it increased 43 million in 1975.

Production variability is caused by behavior of weather and resulting impacts on acreage and yield, farmers' shifts in enterprises in response to price changes, and Government programs. Since 1974, farm programs have had little impact on U.S. agricultural production. Some land has been shifted between cereals and other crops (primarily cotton and soybeans), but yield has been the biggest factor in production variability recently. U.S. cereal yield in 1972 went 12 percent above the trend, when a record corn yield was achieved, but it fell 19 percent below trend in 1974. Yield variability has been greater in the 1970's than during the previous 20 years.

Production variability in other parts of the world also affects the U.S. grain market. Countries with the largest production variability for cereals are the USSR (followed by the United States), the Peoples Republic of China, and nations of South Asia. Production variability results not only from yield fluctuations, but also from changes in area planted.

The impact of weather on yield, although at times extreme for individual production regions, fortunately tends to be offsetting worldwide. Many examples could be cited. In 1974, when the United States had a short cereal crop, other countries had good crops, resulting in world production at levels consistent with world trend. The USSR in 1963 had a cereal yield 26 percent below world trend, whereas Canada's was 12 percent above trend. The average annual deviation in cereal yield from trend is lower for the world as a whole than for any major producing area because of this natural tendency for production variation in one region of the world to offset variation in another region. This offsetting has little value, however, unless all countries have access to surplus production and all countries share the burden of shortages. But this is not the case because trade barriers do exist. Also many countries lack foreign exchange to buy surplus production. These and other factors, coupled with domestic variability, add further instability to demand for U.S. grain exports. Some countries curtail cereal imports in years of shortfalls because of their precarious foreign exchange position. In other countries, grain price stabilization programs protect domestic consumers and producers from surpluses or shortages in the rest of the world. Consequently, when grain is short and world prices are high, the protected consumers will probably not reduce consumption.

The impact on the international market of national price stability programs of many countries is illustrated by Johnson (*4*). His hypothetical example begins with the assumption that half the world's consumers are protected by their governments from world grain price fluctuations. The next supposition is that a poor crop year occurs, aggregate world grain production is reduced 4 percent below trend, and no contingency reserve is available. Consumers protected from the shortage by their governments (overt government action to hold domestic grain prices constant while the world price level increases) do not alter their consumption. The other half of the world's consumers must bear the total adjustment to the short crop, and their consumption drops 8 percent. Because consumer demand for grain is inelastic, an 8-percent reduction of grain available to that half of the world having no grain trade restrictions would raise the world price nearly 80 percent. With no trade barriers and no protected consumers, the price increase would be halved.

Johnson's example can be extrapolated to show how international trade policies of other countries have implications for grain price variability in the United States. If a production shortfall in part of the world is shared globally, the impact on the domestic market of one country would be small. But with restricted trade, a similar shortfall could cause famine in the poorer countries, have little impact on consumers in the countries protected from the world market, and cause major grain market disruptions in countries with no trade barriers on grain.

[2]Wheat, rice, corn, sorghum, oats, rye, and barley.

ADVANTAGES OF MARKET STABILITY

Grain stocks, whether publicly or privately controlled, have been proposed to add stability to the grain market. Reducing price volatility could achieve several objectives. First, the political unrest associated with extreme rises or drops in food prices can be avoided. For example, rapidly rising food prices can create consumer demands for export embargoes, price controls, and other *ad hoc* measures. A major drop in grain prices creates analogous pressures from agricultural producers.

Second, wide variability in grain prices promotes inefficient allocation of resources. The increased uncertainty makes it more difficult for farmers to optimize production. This can result in lower producer incomes and a less desirable supply of food and fiber to consumers.

Third, many economists believe that grain price variability contributes to inflation. Food products derived from grain make up a substantial part of the food component of the Consumer Price Index (CPI). As grain prices move up and down, food prices tend to move up, but they do not fall readily. Many wage contracts and Government expenditures have escalator clauses tying them to behavior of the CPI. Any upward movement in the CPI thus increases costs across the economy, which, in turn, pushes up the CPI. No similar pattern occurs when the CPI moves down. This cost of grain price variation is not internalized by the grain-producing sector.

And fourth, grain price volatility can have a lasting impact on livestock production and prices. Cattle production is especially susceptible to impacts of such volatility due to the considerable time lag necessary for herd size adjustment. A temporary sharp rise in the price of grain, for example, can lead to a reduction in the amount of beef produced 2-4 years hence. Stabilizing grain prices could thus lead to a more stable supply of meat with less price fluctuation.

OPPONENTS OF GOVERNMENT-CONTROLLED RESERVES

Opponents may be classified in three groups. First are persons who object to a Government-controlled reserve on the grounds that profit will povide incentive for the private trade to carry enough grain to provide price stability and efficient resource allocation. The point of departure between the first group of opponents and persons favoring a reserve is the quantity of stocks necessary to achieve social objectives. According to economic theory, if society has (1) the same aversion to risk, and (2) the same discount rate as the private sector, and no social costs are omitted from the marketplace, the private sector, using the profit motive, will store enough grain from one year to the next. Thus, there will be no need for public stocks.

In the second group are farmers who object on the grounds that a Government-controlled reserve would become a political instrument, and it might grow excessive in size and depress market prices. These arguments are derived from the experiences of the 1950's and 1960's, when substantial quantities of grain owned or controlled by the Commodity Credit Corporation kept market prices low, and became a political issue.

In the third group are opponents of the humanitarian objective, who argue that it should be met through foreign aid and that any grain sent to a disaster area should be purchased on the market.

It is not the purpose here to evaluate the pros and cons of a Government-controlled grain reserve. The decision as to whether a reserve is established or not can only be resolved through the political process. It is assumed though, that the grain reserve issue is a public policy alternative needing analysis. An analysis follows.

A U.S. BUFFER STOCK OF GRAIN

The United States dominates world trade in grain by supplying half of the rest of the world's grain imports. The United States could provide considerable stability to the world market by unilaterally operating its own grain reserve, which would buffer its domestic supply and, hence, the world market, from major shortages and surpluses.

Government stocks of grain held by the Commodity Credit Corporation (CCC) during the 1960's and early 1970's provided considerable stability to both U.S. and world markets. These stocks served as a contingency reserve in the mid-1960's, when famine occurred in Southeast Asia; as a buffer in 1970, when blight reduced the U.S. corn crop; and as a buffer 2 years later, when world production was reduced by poor weather.

However, the experience of the 1960's showed that Government-held stocks can grow to excessive size, become very expensive to maintain, possibly depress the market, and become a political football. If the United States adopts a buffer stock policy, the problems of the past need to be reexamined and solutions for at least some of them devised.

Up to now, Government-held stocks have not been accumulated and managed according to a planned stock management strategy, but rather as an unwanted side effect of commodity price support programs. During the 1960's, grain was taken off the market to hold grain prices above unacceptably low levels. Government-acquired grain was then disposed of in any way which would not cause excessive disruption of the domestic and world markets.

RULES FOR MANAGING RESERVES

A major problem associated with the management of a Government grain reserve program—whether international or domestic—is determining how and when to augment or decrease the reserve. Two types of rules are generally discussed; those for quantity and those for price.

Quantity Rules

Quantity rules directly attack the problem of grain surpluses or shortages. When the quantity produced is above trend, some proportion of the excess should be put into the reserve. When production is below trend, some proportion of the deficit should come out of the reserve and be made available for consumption.

One disadvantage of a quantity rule is that it can only be applied in an international context. An example would be if the United States used a quantity rule, based on U.S. output, to manage its own reserve. If the United States had a bumper crop and the rest of the world had a poor one, there would be economic, political, and ethical implications if the United States began building its reserve the same year that the rest of the world needed grain.

There are also disadvantages when a quantity rule is applied internationally. Accurate information on world production is not available quickly enough to make sound management dececisions on world contingency stocks. The best time to put grain in a reserve is right after production, but the size of the crop worldwide is not known for many months. This problem eventually could be overcome as crop information systems improve; for example, satellite-computer linked systems are now being evaluated. Another difficulty is how to determine the trend level of production for the current year. Is it a projection from experience of the last 20 years? An average of the last 3? What if a major change in trend occurs because of the introduction of new high-yielding varieties? These are largely technical or statistical problems, but their correct resolution could avoid major errors in estimating the needed size of a contingency reserve.

Finally, the quantity rule focuses only on production. It ignores any shortrun changes in demand. Total world demand for food does not change much from trend in any 1 year, though total import demand may. Further, demand for individual food items might shift considerably because of changes in relative prices and preferences of consumers. For example, if the price of meat is relatively high, consumers may substitute cereal for some meat in their diet, thus increasing the demand for cereals. A quantity rule, focusing on production, would not be sensitive to this kind of shortrun change in demand.

Price Rules

Price rules focus upon prices and price variability. In its simplest form, a price rule would specify a price at which grain for the reserve would be purchased and a higher price at which grain would be sold from the reserve. When grain prices are relatively low, contingency stocks could be accumulated; when prices are relatively high, stocks could be released. Contrary to the quantity rule, the price rule reflects both supply and demand conditions. Price reflects the opinions of all participants in a market as to current and prospective supply and demand conditions. Such opinions are updated daily. And the price rule can be sensitive to such changes. So long as it does not operate a two-price system, an individual country can use the price rule to manage its own reserve. It might be possible that the United States, because of its dominant position in grain trade, could use the price rule to reduce price instability both domestically and internationally.

But there are also disadvantages with price rules. Price can be manipulated by market power—by a few firms exercising monopoly power or by governments' policy decisions. Thus, the market signals can be distorted from those that would be emitted in the absence of such power. Also, in a world context, the market price does not reflect production shortfalls in countries that have no demand for world market grain or in countries that do not allow price signals to penetrate their borders.

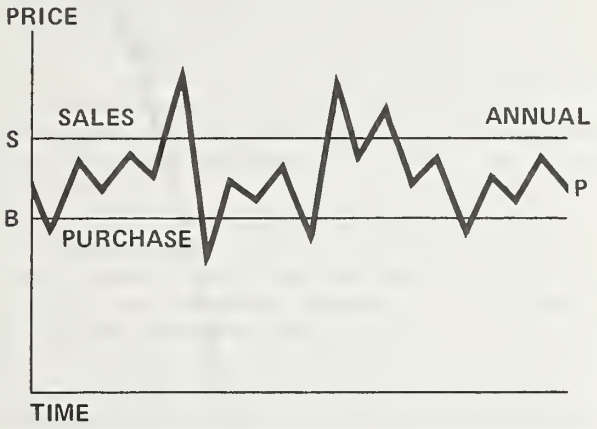
The price rule would be useful in managing a U.S. reserve stock because both the consumer and the producer tend to be more sensitive to price than to quantity. There is ample grain in the United States to meet domestic needs. But if its price gets very high, consumers protest about the price, not the quantity available. And if the price gets very low, producers complain about price. Thus, a stock management rule focused directly upon price, and used to reduce price extremes directly, would reflect this sensitivity to price.

THE STABILIZATION BUFFER STOCK

One objective of a buffer stock is to achieve price stabilization; that is, to reduce market price variability. Both low and high price extremes would be eliminated; the former helping the producer and the latter, the consumer. One buffer stock management rule, in simplified form, is illustrated in figure 1. Over time, P, the market price (without government controls), would vary because of yield variation, changes in world demand, and various other reasons. To reduce price variability in the market, a buffer stock program could be operated to remove the extreme fluctations—keep the market price between prices B and S in the figure. When the market price drops below B, the buffer stock agency would purchase grain until the market price rises to B. When the market price exceeds S, the buffer stock agency sells grain at price S until the market price holds at S or the buffer stock is exhausted.

One management issue is that the purchase price, B, and the sale price, S, would need to be set so that once the buffer stock is established, the quantity purchased would average equal to the quantity sold over time. If S is too high relative to B, the stock would grow to burdensome levels. If B is set too low relative to S, the stock would tend to be depleted and the market price could not be kept from rising above S.

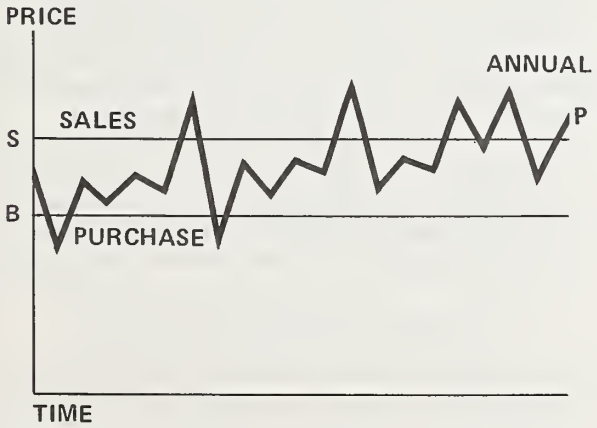
FIGURE 1
USE OF BUFFER GRAIN STOCK TO REDUCE MARKET PRICE VARIABILITY, NO PRICE TREND



If there is an upward or downward price trend over time, purchase and release prices would need to be adjusted accordingly (fig. 2). If the purchase and sale prices were not adjusted upward, the buffer stock would eventually become depleted as the frequency and quantity of sales would exceed purchases.

A second management issue is the size of the price differential between the purchase and sale prices; that is, how much price stability is desired. A narrow differential provides more price stability but requires a larger buffer stock to keep the market price within bounds. The program costs the taxpayer more, and the Government intervenes more often in the market (either purchasing or selling buffer stocks).

FIGURE 2
USE OF BUFFER GRAIN STOCK TO REDUCE MARKET PRICE VARIABILITY, UPWARD PRICE TREND



The potential exists that presence of stocks could distort allocation of resources, such as acreage to certain crops. This potential directly relates to the size of the price differential. With a narrow differential, the market price is constrained to a very narrow range, which reduces the usefulness of price signals for producers and consumers. Also, farmers and grain dealers would have little incentive to privately store grain. Since prospects for a price increase would be slim, there would be no return for storing grain. The Government would thus own all stocks, except for the minimum level necessary for day-to-day industry needs.

A differential of a sale price exceeding a purchase price by 50 to 100 percent would provide some price stability while allowing the market price to perform its allocative function, and it would retain an incentive to privately store grain.

A third management issue involves adjustment of the buffer stock purchase and sale prices over time. For two reasons, prices need adjusting over time. First is the existence of a price trend. If the price moved as shown in figure 2, the purchase and sale prices would need to be increased during the latter years. With a downward price trend, the prices would need to be lowered. Second, initial specification of the purchase and sale prices could be improper relative to longrun market price. Since future prices are not known, any initial specification of purchase and sale prices necessarily would be arbitrary and likely would need to be adjusted in future years.

One clear indication that the purchase and release prices are inappropriate is the size of the buffer stock. If it continually builds, the purchase and release prices are too high; if it continually drops over time, purchase and release prices are too low. One logical way to partially avoid such error is to define a rule in which buffer stock price levels are adjusted according to the current size of the stock. If the stock is large, the purchase and release prices would be lowered.

A buffer stock scheme for wheat with a sale price 50 percent above the purchase price was examined by ERS researchers (*8*). Based upon anticipated future market conditions, results show a buffer stock of 700 million bushels would be adequate to keep the market price within the purchase and sale price range in all but 1 year of 25. In that 1 year, the stock would be exhausted and the market price could exceed the buffer stock sale price. Once the stock had been accumulated, the average annual cost would be about $300 million. Costs would be higher during initial years of purchases, to build the reserve.

However, certain phenomena can vary widely, such as weather, which can make cost averages misleading. In 1 year in 10, the buffer stock could drop below 200 million bushels; or it could exceed 1.3 billion bushels. Likewise, annual Government expenditures could exceed $1 billion in years of large buffer stock purchases or they could generate a profit in years of large stock sales. Results also demonstrated that if the price trended upward because of inflation in the economy or other reasons, the purchase and sale prices must also be adjusted upward. Otherwise,

the stock tends to be depleted and ineffective in meeting the price stabilization objective.

The wheat research results indicated that producers received approximately $500 million less in gross receipts per year, on the average, because of a lower average price. Similarly, domestic and foreign purchasers of wheat paid an average $500 million less per year for the grain. However, because of a more stable domestic market, domestic and foreign demand for U.S. grain could expand, easily offsetting this apparent loss to U.S. farmers.

A government buffer stock of 30 to 40 million metric tons of feed grains and wheat combined would adequately stabilize the U.S. grain market (*6* and *10*). This level would cost an average $400-$600 million per year but the size of purchases, sales, and cost would vary considerably from year to year.

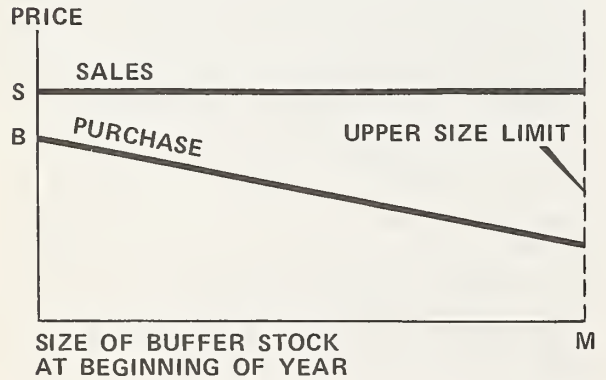
The Insurance Buffer Stock (Wheat)

The primary objective of an insurance buffer stock program is to protect consumers against wheat shortages and the attendant unacceptably high prices. This program, oriented to domestic and foreign consumers, makes grain available when needed. Unlike a price stabilization buffer stock, the primary focus is not to reduce price variability, although that is a major side effect.

Program operation is shown in figure 3. The stock management agency stands ready to sell all grain under its control to any buyer at an initially established price, S. The objective is to have a sufficient stock available to prevent the market price from exceeding S. The size of the buffer stock cannot exceed M. If M's specified level is increased, cost will go up. But more insurance will be provided that future grain supplies will be adequate to keep the market price from exceeding S. With lower levels of S, stock sale price, M must be larger.

According to the insurance buffer stock management rule, the stock management agency purchases grain on the market at the beginning of the crop year at a specified price (B in fig. 3) that varies according to the size of the buffer stock. If the buffer stock were nearly depleted, the purchase price would be relatively high, to increase purchases to rebuild the reserve. If stocks were relatively ample, the economic value of adding the remainder would be relatively low, and the purchase price should likewise be low. The purchase price, set at the beginning of the crop year, would not change until the beginning of the following crop year.

FIGURE 3
INSURANCE BUFFER STOCK PROGRAM



For the stabilization buffer stock program discussed earlier, the relationship among the stock purchase price, stock sale price, and trend in market price must be properly maintained or the program will not work as intended. With the insurance buffer stock, this relationship is much less important because the stock is not used to confine the market price within the range of *both* sale and purchase price. The stock is only used to keep the market price below the sale price—a much less difficult balancing act. Consequently, the market price could drop very low and, if the buffer stock grain bins were filled to the maximum allowed, no purchases to boost prices would be made. A program based on target price concepts, used in conjunction with the buffer stock program, could be used to bolster farm income if market price dropped and stocks were high.

ERS researchers also examined this insurance buffer stocks alternative quantitatively, with the same wheat market model used to examine the stabilization buffer stock. The price was set at $5 per bushel and the maximum Government buffer stock size, at 700 million bushels (22 million tons). The purchase price was a linear function from $4 per bushel with no buffer stock, to $2.50 per bushel with the maximum stock level.

Results indicate that once the buffer stock is established, it is used about 1 year in 5, and it is large enough to hold the market price to $5 in all except the most extreme years (expected to occur less than 3 percent of the time). The program costs the U.S. Treasury $200 million a year (cost of storage plus interest charges minus any profits made on transactions). But 1 year in 10, the outlay could exceed $800 million because of substantial purchases. In 7 years out of 10, the stock size at the beginning of the crop year would be between 500 and the maximum of 700 million bushels. As the general price level increases for all goods including wheat, the likelihood would increase that the wheat market price would reach $5 and the buffer stock would be used. The probability of the stock being completely depleted also increases.

The insurance buffer stock could provide considerable price stability. It could effectively eliminate the possibility of a wheat price exceeding $5. However, there would be less effective stabilization of price when it was dropping.

OTHER MANAGEMENT ISSUES

A question of major concern to farmers is: "Will the size of the buffer stock depress the market price?" A tentative answer is "not necessarily." Buffer stock management

rules can be designed to minimize the depressing effect of the stock. Naturally, when the stock management agency purchases grain, the market price will rise and, when it sells grain the market price will fall. But if there is a substantial specified price range within which neither purchases nor sales are made, and if all market participants (producers and buyers) know and believe the stock agency will act accordingly, the size of the stock should not affect the market within that price range. The management rules need to be explicit, with minimum administrative discretion allowed. The market participants also need to have confidence that the rules will not be frequently changed.

However, if the stock management agency has considerable discretion to determine the quantity of stocks to purchase and sell, the timing of the transaction, and the price, the agency becomes a major source of uncertainty in the market. The agency also will be subject to political pressure to buy or sell grain to help resolve other shortrun political problems. Consequently, when stocks accumulate, their presence would likely depress prices, or at least create a nervous market as buyers and sellers tried to guess what the stock agency would do with its grain.

To keep the management of buffer stocks aligned with longrun objectives rather than subject to shortrun expediencies, it might be necessary to insulate the stock management agency from the daily pressures by removing most of the administrator's discretion from the decisions of when and how much to buy or sell. Another way to insulate the agency, proposed by Jones (*5*) would be to make it quasi-independent, like the Federal Reserve System.

Another serious problem in designing a reserve stock management program is to keep the Government-controlled stock from substituting for the privately held stock. If Government stocks simply replace privately held stocks, nothing is gained. The rules for purchase and sale of Government reserves need to be designed so that the incentive for privately held grain stocks is maintained—or even strengthened. When Government stocks of grain and cotton were large in the 1960's, private stocks stayed at very low levels because little expectation existed for a price rise to cover the cost of holding the grain. One way to minimize this problem is to have a differential between the price at which Government stocks are purchased and the price at which they are sold that is large enough to provide an incentive for storing grain. But, of course, this alternative involves a tradeoff with the price stability objective.

Finally, for a buffer stock policy to efficiently achieve whatever may be its primary objective, it should not be saddled with other tangential objectives, such as farm income support, price support, a guarantee to farmers that their production cost will be covered, or maintaining food prices at reasonable levels. Other programs can be used in concert with a buffer stock policy to achieve these objectives. But if the stock management rules are modified, there is a greater chance, over time, for stock size to grow either too small or too large to achieve the primary objective.

CONCLUSION

If U.S. policymakers decide to establish a grain reserve, many problems will need to be resolved. Based upon recent research results, we conclude the following:

1. For U.S. reserve stock management, price rules are preferred to quantity rules.
2. The objectives desired determine the specification of price rules. It may be deemed desirable to stabilize prices over a range in which the stock release price (and, consequently, the upper bound on market price) is set 50-75 percent above the stock purchase price (the lower bound on market price). With such price differentials, stocks would be purchased about 1 year in 4, stocks would be sold about 1 year in 4, and no stock activity would take place 2 years in 4. With a wider price differential, less reserve stock activity would occur in the open market, a smaller reserve stock would be needed, and costs would be lower. But price would also be less stable.
3. A grain reserve could cost about $300-$500 million annually. The U.S. Treasury outlay would vary greatly from year to year if the Government purchased and sold the grain. Positive balances would be generated in years of large stock sales, and deficits over $1 billion in years of large purchases.
4. The price rules would need to be adjusted over time because (1) they may be initially misspecified, (2) inflation may raise the price of grain, and (3) longrun supply and demand conditions may change, causing grain prices to move up or down.
5. Rules for reserve stock management need to be "hard and fast" to minimize uncertainty in the marketplace. Market stability expected to be achieved by a grain reserve could be lost because of instability generated by arbitrary rules.
6. Rules need to be designed to reduce the chance that Government reserve stocks would replace privately held stocks.

As rules for stock reserve management are modified to achieve various objectives, there are tradeoffs between the performance of the reserve and its cost. Suppose the intent is to reduce the large Government costs in years of large purchases or reserves, and provide incentives for privately held stocks. One method is to design the reserve rules so that farmers retain ownership of the grain. A plan has been proposed in which the Government would contract to pay farmers to hold grain. They would give up their right to sell until the price exceeded a specified level or until the contract expired (*1*). Compared with the

situation with a reserve owned and controlled by the Government, farmers would have more freedom to decide when to sell and they (rather than the Government) could receive the profits from price increases. However, Government expenditures would average more over time because the Government would not receive the price differential on grain purchased and eventually sold. Also some of the market-stabilizing impact of the reserve might be lost because farmers could continue to hold the stocks as the price rose above the specified release price.

There are many other ways to specify the mechanics of a grain reserve. Farmers could grow grain on designated set-aside acreage and store it on farms until needed. The nonrecourse loan could be used as it was in the 1960's to accumulate grain, but the loan rate and the release price would vary, depending upon the size of existing Government stocks (*1* and *5*). Whatever the proposal made, each can be evaluated relative to the principles presented here, and tradeoffs involving cost and performance can be compared.

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AN ASSESSMENT OF GOVERNMENT PROGRAMS THAT PROTECT AGRICULTURAL PRODUCERS FROM NATURAL RISKS

By Thomas A. Miller and Alan S. Walter*

ABSTRACT

A current issue in agriculture is the proper role of Government in protecting agricultural producers financially against crop destruction resulting from natural disasters. Of particular interest is the adequacy of the Federal programs and the overlap between them. This article examines the 1974-75 record of risk protection provided to farmers, including coverage and paid indemnities, of the private agricultural insurance industry, the Federal Crop Insurance Corporation (FCIC), and the disaster payments program (DPP) established by the Agriculture and Consumer Protection Act of 1973. It also examines the relationship of Government programs to general insurance principles and identifies problems with Federal programs, public policy options to correct the problems, and research needed to evaluate relevant options for improving Federal programs. DPP fulfills a need by providing coverage not previously available through private industry or FCIC, especially in high-risk areas. However, DPP has several serious deficiencies; it was adopted with provisions that depart from sound insurance principles. Correcting the problems inherent to the current Federal programs could be accomplished by subsidizing private insurance, repealing or substantially improving DPP, expanding the FCIC programs, limiting the overlap between DPP or the FCIC, or some combination of these options.

KEYWORDS: Crop insurance, Federal crop insurance, disaster payments, agricultural risks.

THE CURRENT SITUATION

INTRODUCTION

A current issue of concern in agriculture is the proper role of Government in protecting agricultural producers against income losses caused by crop damage and destruction due to natural disasters. The most important Government programs are insurance offered through the Federal Crop Insurance Corporation (FCIC) and the disaster payments program (DPP) established by the Agriculture and Consumer Protection Act of 1973. Other Government disaster relief is available through programs administered by USDA's Agricultural Stabilization and Conservation Service (ASCS) and Farmers Home Administration (FmHA), the Federal Disaster Assistance Administration (FDAA), and other agencies.

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While the initial concern focused on the proper balance between the FCIC and the private agricultural insurance industry, the disaster payment program provisions of the 1973 act have broadened the issues. Specific questions have emerged. Do the DPP and FCIC overlap? Do the Government programs represent unfair competition for private industry? Would other allocations of Federal support among programs provide producers with improved protection at no additional cost? These questions and related issues have resulted in several legislative proposals to expand the FCIC program and to repeal the disaster payment provisions of the 1973 act as well as proposals to subsidize the private insurance industry and reduce both Government programs.

This article contains:

- A description of the 1974-75 experience of crop insurance and disaster payments provided by private industry, the FCIC, and DPP.

- A discussion of the insurability of crop risks, farmers' needs for protection, and the performance of the different programs in treating the various types of risks.
- An identification of several problems with the current programs and suggested possible solutions.
- An outline of the main options that are available to the Government in providing agricultural disaster protection.

A REVIEW OF INSURANCE PRINCIPLES

Agricultural hazards range from those ideally suited for insurance to those that cannot be covered by an actuarially sound insurance program. Agricultural risks that are ideally suited for insurance are random over time and geographic area, and have limited liability. Further, it is impossible or unprofitable for managers to deliberately cause any loss to occur. Lastly, the event of loss is clearly identifiable. A brief description of four types of agricultural risks and their insurability provides a framework for evaluating the 1974-75 situation.[1]

The risk to growing crops which meets the requirement of insurability better than any other risk is the hazard of hail. It occurs randomly over farms and over time, that is, hail losses on one farm are nearly independent of those on other farms, and such losses in 1 year are unrelated to those in the following year. The event is identifiable, not subject to any control or action by the farmer, and it occurs with enough frequency that farmers are willing to pay a fair premium for insurance coverage. Thus, crop hail hazards have been traditionally covered by private industry.

A second category of risks includes those hazards to growing crops other than hail. These risks are less insurable, primarily because such hazards tend to affect large numbers of farmers in a given year. The drought hazard, for example, is not independently distributed among farmers. From an insurance standpoint, this lack of independence means that there is a probability in each year for a catastrophic loss covering many farmers. While it may be possible for premiums to equal losses over a period of years, the year-to-year variability in losses makes it difficult for the private insurance industry to provide "all risk" crop insurance. The FCIC was formed to provide such coverage.[2]

A third category of crop risk is that in which the variability and frequency of crop losses are so large in some regions that insurance coverage simply cannot be provided at a premium that farmers can afford. The Federal Crop Insurance Act allows the FCIC to refuse insurance in any county, area within a county, or even individual farm, that involves a high risk. As a result, coverage is not provided for areas where the insurance experience has been so unfavorable as to preclude operation of a sound program. An example of the exclusion of a high-risk area is the 1955 FCIC action to eliminate coverage in 14 counties of Colorado, New Mexico, and Texas as a result of high loss experience from a prolonged drought.

A fourth category of risk, one that neither the insurance industry nor FCIC will insure, is referred to as "moral hazards." Such hazards involve a personal factor of management or decisionmaking by the insured. Either the quality of management can affect the amount of loss incurred or the actual loss results from a management decision. Insurance is generally not provided for such hazards because the availability of coverage would tend to influence the behavior of farmers; that is, influence them to sustain the loss and obtain the insurance payment rather than attempt to minimize the loss.

THE EXPERIENCE IN 1974-75

To provide a perspective on the importance of the three main programs covering crop losses, the 1974-75 experience for each of the programs has been tabulated according to the four risk categories described above. Table 1 shows the average insurance indemnity and disaster payments for these 2 years.

Table 1—Average crop losses covered by insurance and disaster payments, 1974-75

Type of hazard	Private insurance industry	FCIC crop insurance	ASCS disaster payments (DPP)	Total
	Million dollars			
Crop hail	106.7	7.3	[1] 26.9	140.9
All natural crop losses in low-risk area	[2] 6.0	55.6	[3] 278.0	339.6
All natural crop losses in high-risk areas	NA	NA	85.5	85.5
Hazards that prevent planting	NA	NA	28.2	28.2
Total	112.7	62.9	418.6	594.2

Note: NA means coverage not available.

[1] Estimated on the basis of 1974 experience. [2] An experimental program covering 1974 and 1975 only. [3] Includes all low-yield payments in counties where FCIC coverage is available. A portion of this total is made to areas and producers classified as ineligible by FCIC and therefore it should be in the high-risk category. However, it is not possible to estimate this portion.

Sources: (*1*, *2*, *5*) and unpublished county data from FCIC and ASCS.

[1] This section relies heavily upon (*6* and *11*).

[2] The FCIC provides all risk crop insurance which, by law, should not exceed the cost of production. A producer is able to choose a level of coverage through optional "prices" per unit. Prevented planting is not covered. Indemnities paid by FCIC will supposedly equal 90 percent of premiums with the surplus used as a reserve and administrative costs paid by the Government. Appropriations have fallen short of administrative expenses in recent years, which has required the use of FCIC reserves.

Several conclusions can be made from the data in the table. First, little overlap exists between the private insurance industry and the FCIC program. Private industry generally provides hail insurance coverage to farmers based on the gross value of the crop. While FCIC insurance also covers hail losses, it is primarily an all-risk insurance with coverage offered less than that through private hail policies. The farmer with FCIC insurance often purchases additional hail insurance when crop prospects are good. The private insurance industry generally does not cover other crop risks because they are less insurable. The $6 million in payments shown in the table represents an experimental program that has since been terminated.

DPP payments are made for all four types of hazards. Some overlap occurs in coverage between hail insurance and disaster payments, but the effect of DPP on hail insurance sales is unknown. For 1974-75, an average of $26.9 million was paid for hail losses and $278.0 million was made to cover other crop losses in counties where FCIC coverage was available. A part of this payment was provided to farmers and areas within FCIC counties that were ineligible for FCIC coverage because of their high risk (see footnote 3 to table 1). Therefore, somewhat less than $278 million goes to producers who would otherwise be insurable and more than $85.5 million goes to producers who could not be covered by an economically sound insurance program.

Payments for prevented planting under the disaster payments provisions averaged $28.2 million. These involve a considerable amount of moral hazard. When a field in the Texas High Plains has marginal moisture, the producer's decision of whether to plant involves a considerable amount of moral hazard; basically, there is no insurable event. However, a field that is covered by floodwater so that a producer cannot plant a crop represents a natural, identifiable hazard, one that is not under producer control. Such a hazard could technically be insured. Therefore, some of the DPP coverage for prevented planting is insurable while some is a moral hazard which could not be included in a sound insurance program.

Table 1 was compiled from detailed data for each crop for each year. Summaries of these data, showing liabilities, premiums, and loss payments for the three programs, appear in tables 2 and 3. While the information was also tabulated for individual crops, it is not presented here. However, note that 1974-75 DPP covers only wheat, grain sorghum, corn, barley, and cotton, (rice coverage begins in 1976), while the other programs cover all major crops. Soybeans and tobacco are the most important crops in terms of value of production and number of producers not covered by DPP. Also, most of the payments for prevented plantings have been made for cotton; $20 million in 1974 and $19 million in 1975 were paid to producers unable to plant cotton.

There are additional types of hazards and other programs providing protection to farmers besides those discussed above. Hazards affecting livestock are significant; the private insurance industry provides some coverage for any losses. Other Federal programs, as previously mentioned, provide low-cost reconstruction loans, emergency feed supplies, and other types of aid to agricultural producers in designated areas. These programs are not discussed because they appear to provide coverage for other risks and complement the crop insurance programs under consideration. Hazards affecting buildings, other property, and people were also considered beyond the scope of this article.

A PRELIMINARY EVALUATION

An evaluation of available data, a review of relevant literature, and discussions with officials in the private insurance industry, FCIC, and ASCS provide some insights into producer needs for coverage and weaknesses of the current programs. Some of what has been learned is illustrated through discussion of three typical (but hypothetical) farms and an analysis of how the experiences of a high-risk county could have differed had a disaster payment program been in effect since 1945.

PRODUCER NEEDS AND AVAILABLE COVERAGE

Table 4 indicates enterprise selection, allotments, established ASCS or average yields, production costs, and coverage under FCIC and DPP for three typical farms in specified areas for 1975. Each farm was assumed to have yields near the county average and to use improved management practices as required to be eligible for maximum FCIC coverage.

The farm in Champaign County, Illinois, has total plantings of 380 acres of corn and soybeans. The 200 acres of corn planted was nearly 50 percent above allotment, typical in a county which, in total, overplanted feed grain allotments by 42 percent. For a premium payment of $3.50 per acre, FCIC would have insured the corn on this farm, providing a guaranteed yield of 94 bushels and $132 per acre in coverage.[3] The soybean crop was insurable at a cost of $2.60 per acre for $86 coverage with a 28.5-bushel guaranteed yield. The coverage available through FCIC nearly equaled the direct and overhead production costs (excluding land and management charges) for corn and it exceeded those costs for soybeans. The FCIC coverage would decrease somewhat if planting were delayed beyond May 15 for corn and

[3]Yield guarantee is the term employed by FCIC to indicate the yield below which production must fall before payments will be made. Payments are made on the difference between the guaranteed and the actual yields.

Table 2—Crop insurance and disaster payment experience by type of risk and area, 1974

Crop risk	All private insurance companies	Private insurance companies (CHIAA)[1]	FCIC crop insurance	ASCS disaster payments
	1,000 dollars			
Hail:				
FCIC counties				
Liability	[2]6,525,985	4,225,113	---	---
Premium	221,570	143,297	---	---
Losses paid	163,241	95,636	7,156	23,105
Other counties				
Liability	964,062	624,162	---	---
Premium	36,919	23,877	---	---
Losses paid	21,475	12,581	---	3,766
Other risks to growing crops:				
FCIC counties				
Liability	62,304	[3]62,304	---	---
Premium	2,663	2,663	---	---
Losses paid	10,426	10,426	56,095	376,422
Other counties				
Liability	---	---	---	---
Premium	---	---	---	---
Losses paid	---	---	---	118,494
Prevented planting:				
Losses paid	---	---	---	35,281
All risks:				
Liability	7,552,351	4,911,579	[4]1,149,844	---
Premium	261,152	169,837	54,009	---
Losses paid	195,142	118,643	63,251	557,068

[1] Crop-Hail Insurance Actuarial Association. [2] Assumes hail insurance experience for whole industry same as for CHIAA members. [3] Assumes all multiple-peril crop insurance was written by CHIAA members in FCIC counties. [4] From 1975 annual report to the Congress.

Table 3—Crop insurance and disaster payment experience by type of risk and area, 1975

Crop risk	All private insurance companies	Private insurance companies (CHIAA)[1]	FCIC crop insurance	ASCS disaster payments
	1,000 dollars			
Hail:				
FCIC counties				
Liability	[2]7,668,134	4,760,790	---	---
Premium	268,926	166,896	---	---
Losses paid	155,664	90,967	7,489	---
Other counties				
Liability	1,021,445	634,168	---	---
Premium	41,930	26,022	---	---
Losses paid	24,201	14,143	---	---
Other risks to growing crops:				
FCIC counties				
Liability	29,666	[3]29,666	---	---
Premium	1,268	[3]1,268	---	---
Losses paid	1,475	1,475	55,071	[4]202,686
Other counties				
Liability	---	---	---	---
Premium	---	---	---	---
Losses paid	---	---	---	[4]56,236
Prevented planting:				
Losses paid	---	---	---	21,183
All risks:				
Liability	8,719,245	5,424,624	1,572,374	---
Premium	312,124	194,186	73,453	---
Losses paid	181,340	106,585	62,560	[5]280,105

[1] Crop Hail Insurance Actuarial Association. [2] Assumes hail insurance experience for whole industry same as for CHIAA members. [3] Assumes all multiple-peril crop insurance written by CHIAA members in FCIC counties. [4] Includes hail losses which were not reported separately in 1975. [5] Totals as of April 30, 1976.

June 5 for soybeans, without any premium reduction as an incentive for improved management. For the corn, DPP provided $39 coverage per planted acre (well below production costs) without cost to the farmer, but yields had to fall below 46.5 bushels per acre to receive payments. The low coverage and yield eligibility levels largely resulted from overplanting of the allotment.[4] Soybeans, as previously noted, are not covered by DPP.

The hypothetical wheat-sorghum farm in Sedgwick County, Kansas, overplants its wheat allotment by 125 acres but plantings of grain sorghum fall 35 acres short of the allotment. DPP allows a farmer who underplants his wheat or feed grains allotment to increase his allotment for low-yield benefits for one of the other crops. As a result, the wheat allotment for low-yield disaster payments shown in table 4 was increased by 35 acres to 160 so that planted acreage equals 136 percent of the new allotment. The county as a whole planted 150 percent of its wheat allotment without consideration of the transfer of allotments between programs. FCIC provided coverage on wheat of $49 per acre, about equal to the direct plus overhead production costs. The grain sorghum coverage of $35 per acre was $20 per acre less than the indicated costs of production. For a farmer to receive low-yield disaster payments, production had to average less than 11.6 bushels of wheat and 26.2 bushels of sorghum per acre. Maximum payments under the low-yield disaster payments program totaled one-fourth the costs of production (direct plus overhead) for wheat and one-half those costs for grain sorghum.

The third example is a large cotton and soybean farm in Sunflower County, Mississippi. The farmer planted 360 acres of cotton (165-acre allotment) and 370 acres of soybeans. He planted 218 percent of his cotton allotment, which contributed to a reduction in the disaster program yield eligibility level to 193 pounds per acre. Planted acreage in the county was 148 percent of allotment.

Cotton producers have received a disproportionate share of benefits from DPP in the past 2 years. FCIC has perennially lost money on cotton with indemnities equaling 147 percent of premiums from 1948 to 1975. One problem with DPP for cotton has been the maintenance

[4]The requirement for receiving payments is that total farm production of the covered commodity, corn in this case, be low in relation to allotment multiplied by the ASCS established yield. Since the Champaign County farmer is overplanting his allotment, he is less likely to receive disaster payments than if he had restricted his plantings to allotment. He would have been eligible for payments with a yield of less than 69 bushels per acre had he planted exactly 135 acres as allotted.

Table 4—Organization, cost structure, premium, and coverage of disaster and Federal Crop Insurance programs, three hypothetical farms, 1975

Crop	Allotments	Plantings	Established ASCS or average yield	FCIC guaranteed yield[1]	Production costs per acre[2]	Per acre FCI[3]		FCI premium as percentage of coverage	Disaster program coverage[4]	Yield at which eligible for low-yield disaster payment
						Premium	Coverage			
	Acres		*Bushels/acre*			*Dollars/acre*		*Percent*	*Dollars/acre*	*Bushels/acre*
Corn/soybean farm										
Champaign County, Illinois										
Corn	135	200	125	94	134	3.50	131.60	2.7	38.82	46.5
Soybeans	NA	180	38	28.5	64	2.60	85.50	3.0	NA	NA
Wheat/sorghum farm										
Sedgwick County, Kansas										
Winter wheat	[5]215	340	27	19.5	50	3.20	48.75	6.6	13.50	11.6
Grain sorghum	[5]135	100	50	25.0	55	2.90	35.00	8.3	22.00	26.2
Cotton/soybean farm										
Sunflower County, Mississippi										
Soybeans	NA	370	21	14.5	68	4.40	52.50	8.4	NA	NA
			Pounds/acre							
Cotton	165	360	[6]766	[7]470	230	7.00	164.50	4.3	44.59	197.8

NA = not applicable.

[1]Guaranteed yield if harvested. A crop destroyed to the extent it is not worth harvesting would have a slightly lower guaranteed yield unless it is cotton. The guaranteed yield for cotton could be substantially lower if damage occurs early. [2]Variable, machinery ownership, and overhead costs through harvest. Costs would be lower if planting was prevented or crop was destroyed before harvest. FCI premium not included. [3]Per unit price selections on which payments would be based as follows: corn and grain sorghum, $1.40 per bushel; soybeans, $3.00 per bushel; wheat, $2.50 per bushel; and cotton, 35 cents per pound. Best management option assumed. [4]Maximum payment that could be received under the low-yield program per acre planted for each situation is calculated as follows. Adjusted allotment is multiplied by established yield times the payment rate per unit and divided by planted acreage. Coverage per alloted acre is higher for the crops shown except for grain sorghum, where planted acreage is equal to the allotment as adjusted (see footnote 5). [5]Because of substitution of wheat for feed grains, the winter wheat and feed grains allotments for low-yield disaster payments would be 250 and 100 acres, respectively. [6]Established yield. The 10-year average yield would be about 630 pounds, without noticeable trend. [7]Insurance coverage is based upon a 630-pound average yield on nonirrigated production for area 8, best management, third stage.

in many cases of established yields above actual levels because of the inflexibility allowed ASCS in downward adjustments. To illustrate this problem, the example farm is hypothesized to have both established ASCS yields and normal yields (10-year average) equal to the county average for 1975. The 10-year (1965-74) actual average yield was 630 pounds per acre, without any discernible trend but considerable year-to-year variability. However, the ASCS established yield on which disaster payments would be based was 22 percent higher at 766 pounds than the average level. ASCS may be unable to adjust the yield downward even if production continues below the established level. The result is that more disaster protection is provided than otherwise would be the case. Even so, this farmer could receive a maximum of $45 per acre, far below even variable costs of production, and yield must drop below 193 pounds before any payments would be made. This farm could have potentially received up to $16,000 in disaster payments, which is nearing the $20,000 statutory limitation in the 1973 act.

FCIC coverage was available with a per acre yield guarantee of 470 pounds and per acre coverage of $165 at a premium charge of $7.00. The coverage available through FCIC equals 72 percent of the direct and overhead costs of production, compared with 19 percent through DPP. The cotton-soybean farm in the example also planted 370 acres of soybeans, which cost $68 per acre for direct and overhead items to produce. FCIC would insure the soybeans to a value of $53 per acre, three-fourths of production costs, for a premium charge of $4.40 or 8.4 percent of coverage.

Apparently the FCIC is offering coverage that approximates the costs of production including variable, machinery ownership, and overhead expenditures, but excluding land and management charges. In some cases, the liability which FCIC assumes exceeds the costs of production, but in other situations it falls short. Benefits payable through DPP in all three examples fall far short of the direct plus overhead costs of production, partly because the farmers overplanted their allotments. These examples also indicate the low yields that must be incurred before a producer can receive any disaster payments.

A CASE STUDY OF A HIGH-RISK AREA

Let us look closely now at a typical production area that falls in the high-risk category and therefore is not covered by FCIC (third category of table 1). Wheat production in Kiowa County, Colorado, was chosen. On the edge of the Dust Bowl in the 1930's, Kiowa County is a major wheat-producing area with over 200,000 acres of wheat planted annually. An extreme drought in the early 1950's caused the FCIC to abandon its program there in 1955; and from 1955 through 1973, farmers had no protection against crop losses caused by drought.

Data on yields, prices, and costs were tabulated for these wheat producers in 1945-75. The statistical trend yield increased from 7.5 bushels in 1945 to 14.5 bushels in 1975 (fig. 1). The standard deviation around this trend is 8.2 bushels.

Net income per acre averaged $7.21 over the same period (fig. 2). The standard deviation in net income is $20.70 and the coefficient of variation (standard deviation divided by the mean) is 288 percent. Net income was negative in 13 of the 31 years. Farmers' losses in years in which crops failed nearly equaled the net returns for years in which yields were good. An economically sound insurance program would thus probably require a premium so large as to take a significant portion of the returns in good years to cover the poor years.

Based on the record of DPP in Kiowa County in 1974-75, annual disaster payments were estimated under the assumption that the program had operated since 1945. Over the 31-year period, the average disaster payment per acre would have been $4.02. This payment would have increased the average net income from $7.21 to $11.23 per acre and lowered the standard deviation to $18.30 (from $20.70) and the coefficient of variation to 163 percent, a 43-percent reduction. The disaster payments would have increased net income (as shown by the broken line in fig. 2). Most of the increase would have come in poor years, although some farmers have crop failures and receive payments even when the county average yield is high. It is likely that the increase in net income would have been partially capitalized into land values.

In relation to the categories in table 1, Kiowa County represents a major commercial wheat production area where risk is so high as to preclude the operation of a sound insurance program with realistic premium rates (ones that farmers would be willing to pay). If producers in such areas are to be protected against losses from drought, a highly subsidized insurance program or a disaster payments program such as provided by the 1973 act appear to be the only vehicles. Apparently the disaster payment type of program is an effective way of protecting producers from loss of income due to drought in such high-risk areas, but the expense to the Government could be high.

SPECIFIC PROBLEMS AND ALTERNATIVE SOLUTIONS

The current programs have a number of inherent weaknesses. At this point, we can make only a preliminary assessment of the severity of these problems and suggest possible solutions for further evaluation. Three general problem areas are: (a) problems arising from the competition between Federal programs and the private insurance industry, (b) competition and overlap between the FCIC program and disaster payments program of the 1973 act, and (c) the lack of sound insurance principles in the specification of DPP.

Figure 1
YIELD PER PLANTED ACRE FOR DRYLAND WINTER WHEAT, KIOWA COUNTY, COLORADO

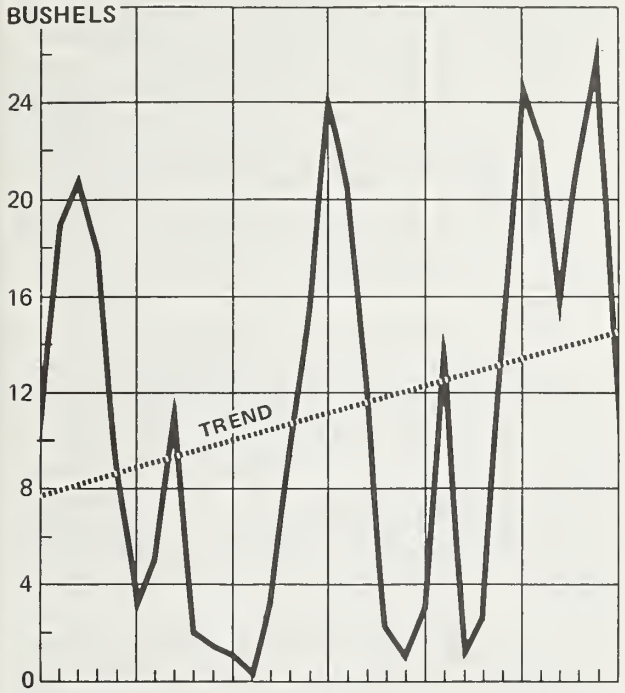
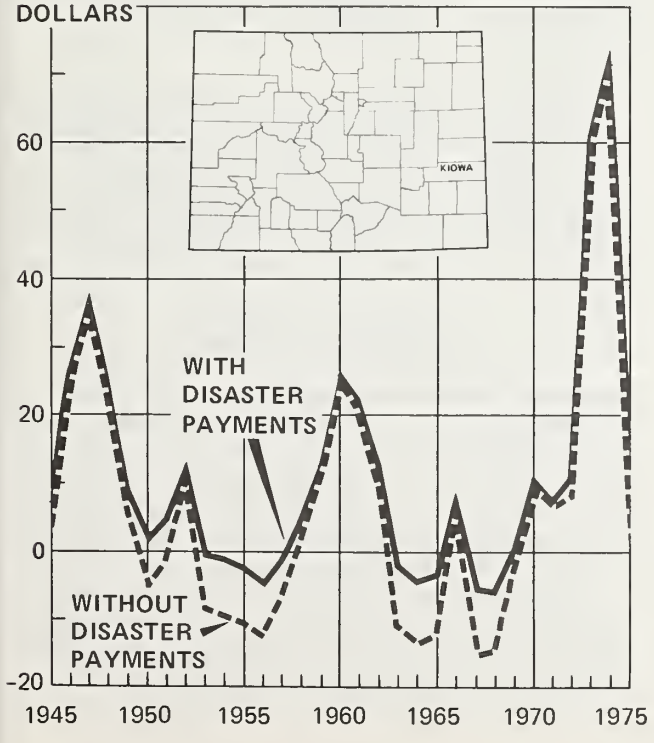


Figure 2
NET INCOME PER ACRE FOR DRYLAND WINTER WHEAT, KIOWA COUNTY, COLORADO



Competition of Private Industry and Federal Programs

Private industry is unable to offer multiple-peril crop insurance at rates comparable to FCIC rates. A possible solution is a reinsurance program whereby FCIC provides reinsurance to the private sector on a sound actuarial basis. This method would enable the overcoming of one private industry barrier to providing multiple-peril crop insurance by permitting the risk to be spread over time.

FCIC premiums are based on a 90-percent loss rate with the excess held in reserve to cover future catastrophic disasters. Operating costs are largely paid by direct Government appropriation. Since private industry must charge premiums high enough to cover operating costs as well as interest on capital, losses must average only about 60 percent of the premium. As a result, private insurance rates would have to be as much as 50 percent higher than FCIC rates to be profitable, even with reinsurance. Farmer participation would likely be reduced with these higher rates. Direct subsidization would be an alternative way for making the private insurance industry competitive, but Government subsidy of the private sector rates would probably be a more expensive way for taxpayers to provide insurance than through traditional FCIC coverage.

Competition and Overlap Between FCIC and DPP

An individual producer may receive payments from both the FCIC insurance and DPP. A large proportion of disaster payments are made in counties with FCIC programs (table 1). One solution to the problem of overlap would be to limit disaster payment eligibility to producers not eligible for FCIC coverage. The FCIC could concentrate on the more insurable crop risks, leaving the high risk areas and producers for the disaster program. While this solution would reduce Government costs, it may also raise questions of fairness between low-risk and high-risk producers; that is, free coverage in one case and not the other.

A second alternative is to make FCIC insurance mandatory (where available) for a farmer to receive the disaster payment. Any indemnity from the FCIC could be deducted from the DPP payment. This option (*15*, p. 42) would eliminate the possibility of a producer receiving double payment for the same loss. However, it would involve rather complex administrative procedures and a high degree of coordination between the FCIC and ASCS. A variation of this alternative would be to continue FCIC coverage as an option but to deduct any potential coverage, whether purchased or not, before making disaster payments.

A third solution is to repeal the disaster payment program and to instruct FCIC to cover all producers and increase participation through expanded sales efforts. A large premium subsidy would be required in high risk

areas (such as Kiowa County, Colorado) to obtain a high participation rate.

A second problem is that the presence of DPP may lower FCIC participation. During the first 2 years of DPP, participation in FCIC programs does not appear to have been significantly affected; indeed, FCIC sales actually increased. The sales increase in FCIC is perhaps partly due to the termination of Government payments for resource adjustment, increases in production costs, the low level of coverage available through FCIC, and perhaps to fears of a period of less favorable weather. However, as farmers gain more experience with disaster payments, FCIC participation could decrease. Lower participation rates could adversely affect the FCIC program since such insurance programs require a minimum level of participation to be actuarially sound.

Lack of Sound Insurance Principles in DPP Program Specification

DPP coverage of moral hazards is difficult to administer and subject to abuse. As an example, a large number of payments under the Texas disaster payment program went to cotton producers who were adversely affected by drifting chemicals sprayed from airplanes on nearby fields (*15*, p. 13). These payments were for damage caused by "...conditions beyond the producer's control," as required in the enabling legislation. Since crop sprayers generally have insurance to cover such claims, there appears to be little rationale for a Federal program to cover such losses. A solution is to limit disaster payment coverage to only natural hazards.

As discussed above, most prevented planting payments also constitute a moral hazard. In arid regions, payment availability could influence producers not to plant crops and to receive payments rather than plant crops under marginal conditions. This practice leads to a considerable amount of "adverse selectivity" in the program operation. A solution is to restrict prevented planting payments in arid regions or to delete the prevented planting provision altogether. However, such a deletion would also affect producers in flood areas where the moral hazard is not present.

A second problem area is that cotton farmers receive a prevented planting payment even when a substitute crop is planted (see *15*, p. 9). A solution is to amend the disaster payment provision of the 1973 act relating to cotton to include the words "or other conserving crops." Such an amendment would prevent a farmer from planting a substitute crop and receiving disaster payments. The rationale for the exceptional treatment of cotton in the 1973 act is unclear. If the net returns from cotton are substantially higher than those of a substitute crop, there is some rationale for basing the prevented planting payment on the differential. This rationale would also be legitimate for other crops covered by DPP. As noted above, a high proportion of prevented planting payments ($19.5 million of the average $28.2 million in the 1974-75) goes to cotton farmers.

A third area of concern is that the payment rate under DPP is not graduated to reflect either the timing of the loss or the costs incurred in production. A single payment rate applies to a producer whether prevented from planting or suffering a loss the day before harvest. Costs to a farmer increase over the growing season as inputs are successively applied. FCIC pegs coverage for some crops to the timing of the loss. At the minimum, prevented planting payments per unit should reasonably be lower than low yield payments. Cost of production data such as that available from the ERS Cost of Production Survey (*6*) would be adequate to provide a basis for graduated payments.

One unit of production can mean entitlement to a large disaster payment—a fourth problem. A farmer who has a yield exactly equal to the disaster payment yield is ineligible while a second farmer who has 1 bushel less production than the first farmer could be eligible for a substantial payment based on the difference between his actual yield and his established yield. This problem was emphasized both in the GAO report (*15*, p. 6) and in discussions with ASCS officials who administer the program.

In the future, farmers who become aware of their disaster production level could sometimes modify harvesting enough to obtain a payment. Such adaptation to the program would be expected to place a considerable burden on program administration to prevent abuses, leading to increased costs over time. One solution is to base payment eligibility and coverage on the same yield, as is done in the FCIC program. Payments would then simply be made on the difference between the disaster yield and the actual yields. Another solution is use of a variable scale payment rate.

Production on nonallotment acreage makes otherwise eligible producers ineligible for disaster payments. This major problem in DPP was discussed in detail in (*15*, p. 8). Geographic and fam production patterns have shifted significantly in the last 2 years, while ASCS allotments remain based primarily on 1959-60 acreages for feed grains and 1951-53 acreages for cotton and wheat. One alternative is to restrict the production used in determining payment eligibility to that produced on allotted acreages. This restriction would provide increased protection for allotment acres but would do nothing toward providing such protection for nonallotment acreage. A second alternative is to expand the disaster program to all planted acreage on all farms. ASCS would probably have to obtain a new and current production history for all farms. The $20,000 payment limitation would apply more frequently with such an expansion in coverage.

Another area of concern is that the yield at which a producer becomes eligible for DPP is often not two-thirds of the ASCS established yield as many thought the 1973 act intended. ASCS maintains an established yield and a

disaster yield for each farm. The disaster yield is used to determine eligibility for low yield payments. It is calculated as two-thirds of the established yield times an adjustment factor to reflect any disparity between established and historical yields. If a producer is eligible for a low yield payment, payments are made on the basis of 100 percent of the established yield; the disaster yield is then ignored. The GAO report (*15*, pp. 14-19) questions the disaster yield from a legal standpoint and points out the implications of the current ASCS definition.

Notwithstanding the legal questions, the analysis in Kiowa County, Colorado, suggests that ASCS may be justified in defining a disaster yield that is somewhat lower than two-thirds of the established yield. The ASCS established yield represents a *harvested acre* yield-basically, the production harvested from allotted acreages. However, the concept of crop insurance is based on *planted acre* yields—payments are made when production per planted acre falls below certain disaster points. Crop insurance therefore implicitly recognizes usual abandonment rates.

A solution to the problem of maintaining inconsistent disaster and established yields is to simply define the disaster yields as two-thirds of the established yield. While this alternative overcomes the legal objections, it does not solve the problems connected with administering an insurance program based on harvested acre yields. A more sound alternative in terms of insurance principles would be to redefine all disaster program yields on a planted acre basis.

Who shall pay for protection represents another problem area. It may be argued that the primary beneficiaries of DPP, the producers, should pay. The GAO report suggests that Government costs could be reduced considerably if premiums were paid by the farmers. A counter argument is that a program that protects agricultural producers against crop losses may lead to increases in food production and lower longrun food costs to the benefit of consumers.

There may be some significant problems in transferring the cost of the program to farmers. The Kiowa County study suggests that it may not be possible to operate a disaster program in some producing areas without a considerable premium subsidy. The alternative of raising premiums to farmers in low-risk areas to help defray the costs of insurance in high-risk areas could tend to decrease participation rates in low-risk areas. Such a problem does not arise in a Government-subsidized program such as the current disaster program.

These evaluations and suggested solutions for current problems represent a preliminary evaluation of the situation. Additional research is currently underway in the Agricultural Policy Analysis Program Area in the Commodity Economics Division of ERS to identify the magnitude of the problem of basing DPP coverage on outdated allotments and to develop a framework to allow estimation of costs to the Government under present or proposed disaster payments programs. Further research is necessary to provide improved estimates of the costs and benefits of the various options discussed.

POLICY OPTIONS AND NEEDED RESEARCH

A number of options are available to the Government for assuring that the agricultural industry has protection against crop losses resulting from natural disasters. The general categories of options, the major considerations for each, and research needs are discussed below. The options listed in this section are not mutually exclusive, and some combination may provide the best solution.

SUBSIDIZE THE PRIVATE INSURANCE INDUSTRY

This option has been proposed primarily to decrease the Federal role in crop insurance and to encourage private industry to enter the field. At the minimum, it would include a reinsurance program for private industry so that any losses could be balanced over a number of years. At the maximum, the Government could subsidize private industry to cover operating expenses and returns on investment so that rates for multiple-peril crop insurance could be comparable to those of the FCIC. Research is needed on the form and costs of such subsidies as well as on means to assure that private industry would provide a scope of coverage that would be in the public interest.

REPEAL THE DISASTER PAYMENT PROGRAM

The high cost of DPP and its "open ended" liability have led to proposed legislation for repeal. This option is usually discussed in connection with an expansion of the FCIC program (*15*, pp. 38-40). A key intelligence need concerns the number of producers served by DPP that are currently ineligible for FCIC coverage. The current disaster payment coverage of such producers seemingly exceeds the current level of all FCIC coverage (table 1).

EXPAND THE FCIC PROGRAM

Three types of changes have been proposed for the FCIC program: (a) reorganization of the FCIC to make it more responsive to producers' needs, (b) an increase in the Government's support of FCIC administrative costs so that premium money would not be required to cover operating expenses and sales efforts could be expanded, and (c) a change in the legislation so that premiums in high-risk areas could be subsidized.

It is useful to consider these proposals in connection with the insurability of hazards. In the low-risk areas currently covered by FCIC, participation could be increased by a stepped-up sales effort requiring more Government funds. Such an increase in Government-provided operating funds could help expand the program because insurance basically requires an extensive sales effort. Past FCIC experience may suggest the relationship between additional participation and expanded sales efforts.

A second type of FCIC expansion would involve an expansion into the high-risk areas as discussed. This expansion may require a considerable premium subsidy, it could be quite costly, and perhaps be no more cost effective in the marginal areas than the current disaster payment program. This sort of expansion also changes the basic philosophy behind the FCIC, and research is needed to determine the feasibility of such a change.

IMPROVE THE DISASTER PAYMENT PROGRAM

DPP was enacted as part of the 1973 act with little evaluation from an actuarial standpoint. Since the program basically represents free insurance, the hazards covered and methods of payment could be based on sound insurance principles. In this respect, a number of modifications could be made in DPP as it currently is formulated to:

- Improve the equity among producers so that payments more nearly equal losses.
- Avoid excessive payments in certain instances.
- Accomplish program objectives at a reduced cost to the Government.

Most of these changes would require modification of the legislation. Research is needed concerning the impact of specific changes in the way disaster yields are defined, in payment rates, and in the way eligibility is determined. Some of the specific changes that could be made to improve DPP have already been discussed. There may be other proposals which could be suggested by program administrators or insurance experts, in addition to those presented here, which could be elaborated on and researched.

LIMIT THE OVERLAP BETWEEN THE DISASTER PAYMENT AND FCIC PROGRAMS

As discussed earlier, some options are available to lessen or eliminate the overlap between DPP and the FCIC program. Research is needed to evaluate ways of reducing Government costs while continuing to provide the necessary, but unduplicated, coverage to producers who suffer significant crop losses.

Some of the means possible involve varying degrees of mandatory programs. For example, the FCIC insurance could be made mandatory in all areas where it is offered, or FCIC insurance could be made a requirement for eligibility for the disaster payment program. While such options may make sense from the standpoint of efficiency, they may not be politically feasible. For all options discussed, and this option in particular, planning with administrators and policy people would avoid devotion of significant research effort to options that are not politically feasible.

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REFORMULATING GOVERNMENT PROGRAMS FOR RICE, PEANUTS, AND ELS COTTON: ECONOMIC CONSIDERATIONS

By
Alan S. Walter*

ABSTRACT

Backgrounds of Government programs for rice, peanuts, and extra long staple cotton are discussed. Economic relationships important to supply, demand, price, and Government expenditures are indicated in a framework which could be useful if implementing market-oriented programs for these commodities becomes an issue.

KEYWORDS: Cotton, extra long staple; Government programs; peanuts; rice.

INTRODUCTION

The Agriculture and Consumer Protection Act of 1973, which expires next year, implemented 4-year, market-oriented programs for wheat, feed grains, and upland cotton. As replacement legislation for the 1973 act is developed, other crops might also be considered for inclusion, in the same format as for the major crops. The Rice Production Act of 1975 also expires next year. Although peanut legislation did not pass in the 94th Congress, further consideration in 1977 is almost certain. There may, therefore, be a unique opportunity for policymakers to consider new legislation for rice and peanuts (and possibly extra long staple (ELS) cotton) at the same time as programs are developed for wheat, feed grains, and upland cotton.

Although rice, peanuts, and ELS cotton, relatively minor commodities, attracted little widespread attention in the past, they have become highly visible in recent years. Both economic circumstances surrounding these crops and the absence of formerly large Treasury expenditures on the major commodities now make expenditures for the three minor crops more visible. Since Government activities in the administration of major commodity programs have significantly diminished since 1973, it is sometimes suggested that the concepts embodied in the 1973 act should be extended to other commodities under Government programs.

For those who favor such programs as those included in the 1973 act, there are many obvious deficiencies in Government programs for some of the minor commodities. In the legislation enacted February 1976 for rice, there is movement away from the marketing quota approach. But the program is for only 2 years and does not appear so market oriented as programs included in the 1973 act. The current program for peanuts, basically unchanged since 1949, shows little market orientation and has resulted in large Government outlays. Current supply and demand conditions for ELS cotton are such that its program has little effect on production and prices, but changing economic conditions could quickly reverse this. In addition, changing the ELS cotton program could logically be suggested if the marketing quota approach is discarded for the other minor crops.

The 1973 act is commonly called market oriented without a clear understanding by many as to the precise meaning of the label. Market orientation defines the scope, timing, and form of Government intervention, but it does not preclude public actions and thus it is not the same concept as that of a "free market." The 1970 Economic Report of the President, in stating criteria for desirable commodity legislation, defined market orien-

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tation (9).[1] The philosophy of this statement was generally applied to the 1973 act. This report stated:

> Farm policies on field crops should give greater emphasis to market forces and thus reduce direct governmental participation in the marketplace. Specifically three goals should be sought. First, prices should become more flexible so that they approximate equilibrium between supply and demand when averaged over a period of years....
>
> Second, production should not be controlled by limiting individual crop acreages; rather it should be guided by market prices....
>
> Third, direct income payments, properly applied, offer a more efficient way to support farm income than high price supports....

This statement summarizes the objectives of some of the participants in formulating the legislation in 1973. Through the legislative process, provisions consistent with market orientation were adopted. Loan rates, target prices, supply control measures, allotment levels, and other program provisions could have been adopted over a range of values which would have been consistent with market orientation, but the results could have differed, depending upon the specific program provisions adopted. In considering new legislation for other commodities, there are several program types or sets of provisions in a target price program that meet the general criteria for market orientation. The expected results may differ depending upon the provisions that are adopted.

This article examines the economic fundamentals of the three commodities, rice, peanuts, and ELS cotton, without proposing any specific programs, should formulation of market-oriented programs (such as those included in the 1973 act) for rice, peanuts, and ELS become an issue. Several difficult questions emerge. By freeing producers of controls, is it likely that production can increase, or at least be maintained? Without controls, will exports increase as has occurred with the major crops? What factors determine prices in a market-oriented situation, and what price levels could be expected? Can Government influence on the production and use of rice, peanuts, and ELS cotton be quickly reduced? What factors will determine Government involvement in new programs? Some of these questions are difficult to approach, but the economic fundamentals presented here should provide some guidance.

[1] Italicized numbers in parentheses refer to items in References at the end of this article.

RICE

The United States produces about 1.5 percent of the world's rice. Domestic production centers in five States. Arkansas, the largest producer, accounted for a third of total output in 1975 while California, Louisiana, and Texas each accounted for about a fifth of the production (table 1). Though a relatively minor producer compared with the rest of the world, the United States is the largest exporter. It supplies about a fourth of total world exports and moves as much as two-thirds of domestic production abroad in some years.

The $1 billion value of rice production in 1975 equaled less than 2 percent of the value of the principal crops produced in the United States. However, rice is extremely important to the economies of the major producing areas. It contributes about 25 percent of the total value of principal crop production in Louisiana and Arkansas, and 7 percent in Mississippi and Texas. It accounts for more than 4 percent of California's diversified crop production. In some sections of these States, the importance of rice production is much greater. Thus, factors affecting rice

Table 1—Production and value of rice and principal crops, by States, 1975

	Rice production		Value of production		Value of rice relative to principal crops
			Rice	Principal crops	
	Million cwt.	*Percent of total*	*Million dollars*		*Percent*
Arkansas	40.1	31.4	322	1,226	26.3
California	30.1	23.6	226	5,154	4.4
Louisiana	25.1	19.7	178	741	24.0
Mississippi	6.7	5.3	54	772	7.0
Missouri	.8	.6	6	1,533	3.9
Texas	25.0	19.6	225	3,160	7.1
Total	127.6	100.0	1,011	55,695	1.8

Sources: Rice data are from *Field Crops*, Crop Rptg. Board, Statis. Rptg. Serv., May 4, 1976; principal crops data are from *Crop Value*, Crop Rptg. Board, Statis. Rptg. Serv., Jan. 29, 1976.

are considerably more significant to these producing areas than national figures would suggest.

The value of rice production increased substantially between the crop years of 1971/72 and 1975/76, from $450 million to $1 billion because of higher prices and expanded acreage. U.S. production in 1975/76 totaled more than 127 million hundredweight, about 50 percent above the level in 1971/72 (table 2). The major contributing factor has been the expansion in acreage, since yields dropped slightly during the period. Domestic use of rice increased slightly to 42 million hundredweight in 1975/76, with little year-to-year fluctuation. Exports have varied more than domestic use, ranging from a low of 50 million hundredweight in 1973/74 to a high of 70 million hundredweight in 1974/75. The commercial element of exports has increased substantially since 1971/72, offetting a decline in P.L.-480 movements.

The level of rice production and exports has been affected by Government programs which have controlled production and encouraged and financed exports, all in an effort to maintain prices. Government expenditures for rice programs, including Commodity Credit Corporation (CCC) activities, P.L.-480, and export subsidies, have been substantial. They reached a high of $332 million for the 1973/74 crop, but they will probably be exceeded for the 1975/76 crop. Outlays averaged $275 million per year from 1971/72 through 1974/75. In contrast to other programs in which Government expenditures have been mainly for CCC support activities, most of the rice-related expenditures since 1961 have been for P.L.-480 and other export programs. Some of these expenditures may more validly be considered a part of foreign aid or of programs that contribute to national security rather than to agricultural support. Even so, without the export programs as a means of disposal for surplus production, prices would have been lower and less rice would have been grown and processed in the United States.

Although not part of formal legislation on rice, foreign marketing policies of the United States must be considered an integral part of the rice program. Exports under P.L.-480 totaled a high of 48 percent of U.S. rice production in 1971/72, and they have exceeded commercial exports in many years. Most P.L.-480 exports have been under Title 1, and these have been sold for foreign currency and long-term dollar and convertible foreign currency credit.

Table 2—Rice, rough equivalent: production and use, prices, CCC activity, and Government expenditures, selected years (Crop year beginning in August)

Rice	Unit	1962	1965	1968	1971	1972	1973	1974	1975[1]
		Production and use							
Allotment	1,000 acres	1,818	1,819	2,401	1,836	1,837	2,222	2,100	1,800
Harvested acreage	Do.	1,773	1,793	2,353	1,818	1,818	2,170	2,536	2,802
Yield per harvested acre	Pounds	3,726	4,255	4,425	4,718	4,700	4,274	4,432	4,555
Production	Mil. cwt.	66.0	76.3	104.1	85.8	85.4	92.8	112.4	127.6
Domestic disappearance:									
Food	Do.	21.5	23.5	27.0	25.5	25.1	26.1	28.6	30.0
Seed	Do.	2.4	2.7	2.9	2.5	3.1	3.6	4.0	3.4
Brewer's use	Do.	4.1	4.7	5.8	7.4	7.6	8.1	8.4	9.0
Total	Do.	28.0	30.9	35.7	35.4	35.8	37.8	41.0	42.4
Exports:									
Commercial	Mil. cwt.	16.0	27.1	25.6	15.9	28.6	31.8	44.4	33.7
P.L.-480	Do.	19.5	16.2	30.5	41.0	25.4	17.9	25.1	20.9
Total	Do.	35.5	43.3	56.1	56.9	54.0	49.7	69.5	54.6
Ending stocks	Mil. cwt.	7.7	8.2	16.2	11.4	5.1	7.8	7.1	37.7
		CCC activity							
Placed under loan	1,000 cwt.	12,224	9,997	24,280	31,342	22,926	19,146	9,256	24,500
Unredeemed loans (ownership transferred to CCC)	Do.	1,841	403	6,320	1,214	1	0	0	19,000
		Prices and values							
Loan rate	Dol./cwt.	4.71	4.50	4.60	5.07	5.27	6.07	7.54	8.52
Received by farmers	Do.	5.04	4.93	5.00	5.34	6.73	13.80	11.20	7.93
Value of production	Mil. dol.	333	376	521	458	575	1,280	1,261	1,011
		Government expenditures							
P.L.-480 and mutual security aid	Do.[2]	112.7	60.5	170.9	214.5	244.4	317.3	285.3	248.9
CCC net expenditures	Do.[3]	44.1	51.5	45.8	5.4	21.6	14.7	---	188.8
Total expenditures	Do.[4]	156.8	112.0	216.7	219.9	266.0	332.0	285.3	437.5
Government expenditures as a percentage of value production	Pct.	47	30	42	48	46	26	24	39

[1] Preliminary figures. [2] Fiscal year basis, 1962 crop year corresponds to 1963 fiscal year. [3] Includes export payments (subsidies), storage and handling, and losses on rice purchases. [4] Does not include short term export credits.

Before the 1976 crop year, rice production was controlled through provisions of the 1938 Agricultural Adjustment Act and the Agriculture Act of 1949. This legislation called for the Secretary of Agriculture to impose marketing quotas, with approval of the growers. Quotas would be deemed necessary under the act if prospective supplies would be excessive. If the Secretary proclaimed marketing quotas and the producers approved, or if quotas were not proclaimed, USDA would be required to provide price support through loans and purchases set at between 65 and 90 percent of parity. Marketing quotas were implemented through allotments to producers based on their 1951-54 acreage.

Rice legislation prior to 1976 generally has not been market oriented. The program under the earlier laws resulted in prices above world levels in many years. Production did not shift with comparative advantage except in 1974/75 when quotas were suspended, and subsidized export programs were needed in most years. Thus, the rice industry was out of adjustment, at least before 1974. When mandatory controls were lifted in 1974/75, production expanded and shifted. Market prices for a time remained high enough to lessen Government involvement. However, demand could not sustain the higher prices, and surpluses appeared in 1975/76. Had the old program been retained, mandatory controls would have been reinstated and the industry might have again been out of adjustment. But new legislation was passed and, as a result, mandatory controls are no longer applicable. The industry's problems were passed on for resolution under the new program. In the following section, we consider whether the farm legislation objectives previously outlined are likely to be met by provisions of the Rice Production Act of 1975 or further changes in the program for rice may be needed.

THE RICE PROGRAM FOR 1976/77

The Rice Production Act of 1975, enacted into law during February 1976, drastically changed the rice program. This legislation instituted a program with a target price and deficiency payments, CCC loans, and disaster payment provisions similar to the programs for the major commodities in the 1973 act. The program will automatically revert to the provisions of the previous legislation after 1977/78, unless legislative action is taken. (See the Penn and Brown article in this *Review* for a discussion of the implications of reverting to basic legislation.)

The 1975 Rice Act is modeled after the Agriculture and Consumer Protection Act of 1973, but it contains some important differences. The law established and distributed to 1975 allotment holders a national rice allotment of 1.8 million acres (not subject to the discretion of the Secretary of Agriculture) as a basis for program benefits; for example, loans, deficiency payments, purchases, and disaster provisions. The Agricultural Stabilization and Conservation Service (ASCS) State offices may allocate up to 1 percent of the allotments in each year to new producers. The law initially set the target price at $8 per hundredweight and the loan rate at $6 per hundredweight for 1976, to be adjusted to reflect movements in USDA's prices paid index (PPI) between January and July of 1976, and further changes in the PPI for 1977/78. Deficiency payments, loans, and purchases can be made only on a program participant's base production (allotment times established yield). Allotment holders may receive deficiency payments on their entire base production, even if they plant beyond their allotment. They may also plant other crops in place of rice, at the Secretary's discretion, and remain eligible for deficiency payments.

The law allows the Secretary to require a producer to set aside as much as 30 percent of his allotment as a means of controlling the supply. The law does not permit USDA to directly restrict rice production. Allotment holders cannot be required to restrict their acreage to a share of their allotments to remain eligible for program benefits as the law allows for wheat, feed grains, and upland cotton. The land set aside in the rice program could be land which would have produced a crop other than rice. A participating producer remains eligible for program benefits even if he overplants his allotment. The law places a limit of $55,000 on the payments that can be received by a producer from the rice program, excluding resource adjustment payments (set aside), loans, and purchases. Any producer who is likely to exceed the payment limitation must be compensated through an easing of set-aside requirements.

The loan rate for 1976 at $6.19 is 30 percent lower than it would have been under the previous legislation ($8.85), but the allotment holders have other benefits to offset at least partially this difference. Allotment holders can receive deficiency payments if prices fall below $8.25. In addition, the new law contains a natural disaster provision similar to the one in the 1973 act. Allotted acreage is about 10 percent more than it would have been in 1976/77 under the old law (1.8 million acres mandated by the new law, compared with 1.65 million announced in December 1975 for the old program before the law was changed).

Rice planted acreage and production in 1976, the first year under the 1975 Rice Act,are down substantially from 1975. The 2.45 million acres planted in 1976 is 13 percent below the 1975 acreage but 0.6 million acres more than the 1973 level when quotas were in effect. Projected 1976/77 production of 112 million hundredweight is 12 percent below the previous year but available supply will exceed the 1975/76 level due to dramatically increased carryin (7.1 million hundredweight for 1975/76 and 37.7 million hundredweight carried into 1976/77). Largely responsible for the decline in acreage and production are a combination of unfavorable market conditions and a provision in the bill allowing producers to receive their full deficiency payment even though they may plant less than their allotted acreage of rice.

Even with the decrease in acreage for the 1976 crop, the CCC will probably incur substantial deficiency payments ($100-$150 million), unless world grain production

takes a drastic turn for the worse. Market prices, if both the U.S. and world crops are normal, will likely be less than the target prices. The first deficiency payments may therefore be for rice, instead of wheat, feed grains, or cotton. It appears that prices may stay above the loan rate, based on conditions early in the marketing year.

FORMULATING LEGISLATION BEYOND 1977/78

The likelihood of deficiency payments in 1976/77 raises the question of whether the initial target prices were set too high. Will payments be necessary in 1977/78 and beyond, if the law is extended? Is the 1975 act market oriented overall and are its loan rates, supply controls, and target prices in line with market orientation?

The objective of market orientation would seem consistent with making deficiency payments in unusual years but preclude the necessity of payments year after year. Estimating the likelihood of deficiency payments on a continual basis requires the consideration of a number of economic variables and relationships. One indicator is a comparison of the ratios of target prices to costs of production for rice and other crops. A second indicator is to compare returns to producers in relation to alternative enterprises. The loan rates or provisions for setting loan rates can be evaluated in terms of their likely impacts upon supply and whether they would equate to a reasonable price in years when export markets are weak. Similarly, the allotment levels can be reviewed as to usefulness in maintaining or adjusting supply in line with market needs. The Rice Act can be evaluated in terms of its ability to keep supply in line with demand, recognizing the dependence on foreign demand. We can also consider the act's usefulness in facilitating adjustments if decisionmakers indicate that the P.L.-480 program should be increased or diminished.

Evaluation of the 1976/77 Target Prices

Projected 1976 average production costs (direct plus overhead) for several crops, target prices, and the ratios of target prices to the specified costs of production are shown in table 3. Target prices for crops other than rice range from 20 percent more than the average direct and overhead production costs for wheat to 17 percent less than costs for barley. But rice has a target price 37 percent more than the average costs, the highest ratio for any of the commodities. Thus, the 1975 act may give more income protection to rice allotment holders than to producers of the other target price commodities. The higher ratio may also indicate that market prices are more likely to fall below target levels for rice than other crops, an argument which can be strengthened by some intercommodity comparisons.

The competitive relationship between rice and other crops will be important in determining both the likely amount of deficiency payments over time and the chance of prices falling to or below the loan level. Grant and Holder (*2*) indicate that adequate land and water resources to support 4.4 million acres of rice are available, 55 percent more than was planted in 1975 and 80 percent more than in 1976. Other researchers indicate these estimates may be conservative, at least for certain areas (*8*). The profitability of rice compared with other crops will determine the acreage of rice planted. The reduction in rice acreage for 1976 following rapid expansion in 1974 and 1975 demonstrates the shifts of resource use that can occur quickly to meet changing economic conditions.

Table 3—Target prices, loan rates, and average production costs, selected crops, 1976/77 crop year

Crop	Target price	Loan rate	Direct plus overhead production costs[1]	Target price to cost of production	Loan rate to cost of production
	Dollars per bushel			*Ratios*	
Corn	1.57	1.25	1.48	1.06	0.84
Grain sorghum	1.49	1.19	1.56	.96	.76
Barley	1.28	1.02	1.54	.83	.66
Wheat[2]	2.29	1.50	1.91	1.20	.79
Soybeans	---	2.50	2.50		1.00
	Cents per pound				
Peanuts	---	19.7	9.5		2.07
Cotton, upland[4]	43.2	37.12	40.7	1.06	.91
Cotton, ELS	---	[5]74.75			
	Dollars per hundredweight				
Rice	[3]8.25	[3]6.19	6.02	1.37	1.03

Note: Dashes mean not applicable.

[1] Costs include variable, machinery ownership, and overhead costs based on the midpoint of projected yields for 1976. Source: (*4*). [2] Costs after value of wheat pasture is subtracted. [3] Reflects changes in the Prices Paid Index between January and July 1976. [4] Costs after value of cottonseed is subtracted. [5] Includes direct payment of 1.51 cents per pound.

Competitive relationships among crops in the Mississippi River Delta and adjacent areas will to a large measure determine the viability of any rice program, particularly the current one. These areas apparently have a comparative advantage and a large potential for expanding rice acreage. The States of Arkansas, Louisiana, and Mississippi could potentially grow 3 million acres, compared with the 1.7 million planted in 1975, and 1.5 million in 1976 (*2*). Soybeans are the most important competitor with rice for resources in much of this region. If repeated deficiency payments are to be avoided, the target price for rice must reflect the economic competitiveness with soybeans and it must be set so that soybeans give returns somewhat equivalent to those of rice at the target price.

Boutwell and others (*1*) suggest a formula for determining the price needed for a crop to equate expected returns above variable costs with a second crop. This formula does not account for any complications caused by the rice programs nor for the potential benefits of rotating crops:

$$P_R = \frac{(P_{SB} \cdot Y_{SB}) - VC_{SB} + VC_R}{Y_R}$$

where:

P_R = Price (dollars per hundredweight) of rice at which rice breaks even with soybeans
P_{SB} = Producer's expected market price (dollars per bushel) of soybeans
Y_{SB} = Producer's expected yield (bushels per acre) for soybeans
VC_{SB} = Variable costs (dollars per acre) of producing soybeans
VC_R = Variable costs (dollars per acre) of producing rice
Y_R = Producer's expected yield (hundredweights per acre) for rice

Applying yield data and costs from Krenz (*4*) in the formula gives the following results (using an assumed soybean price of $4.75):

$$P_R = \frac{(4.75 \cdot 31) - 45.89 + 198.52}{42.8}$$

$$P_R = 7.01$$

For a producer with average costs and yields, without considering Government programs, rice at $7.01 per hundredweight would be expected to give per acre returns above variable costs equal to soybeans in 1976, if soybeans sell for $4.75 per bushel. With soybeans at $5.50, the break-even price for rice would be $7.55. An $8.25 per hundredweight rice price (the 1976 target level) breaks even with soybeans at $6.47.

Actually, the costs of production, expected yields, and expected market prices differ among producers. So, the expected break-even price varies among growers, and producers may plant some rice and soybeans regardless of prices to avoid risk, spread labor, and facilitate rotations. Even so, these figures illustrate some important points.

Only if rice market prices remain above the target price will CCC be able to avoid making deficiency payments. If producers attempt to maximize profits, Mississippi River Delta producers may be expected to shift to rice from soybeans at a rice price of less than $8.25 per hundredweight, unless soybeans exceed $6.47 per bushel, using the previous cost and yield figures. Whether soybean prices can remain near the $6.47 level over a long period of time is questionable. With the large number of acres that could be planted to rice, it may make it extremely difficult to hold rice market prices above the current target level without a substantial shortage of rice in export markets. Farmers in the Delta could profitably plant substantial acreages above rice allotments, even if they expected to receive less than the target price, depending upon soybean prices. Producers with allotments could receive substantial deficiency payments. Because of the flexibility given to producers, a person could receive the deficiency payment, even if he substantially over- or under-plants his allotment. These figures indicate that the current target prices may be consistent with considerable deficiency payments, unless effective supply control means are used to reduce production, or unless P.L.-480 or other programs are expanded to increase demand. Therefore, the target price level does not seem market oriented, and continued deficiency payments may be expected.

Supply Control Measures

As an attempt to raise market prices and reduce deficiency payments, USDA could implement some of the supply control features provided in the 1975 Rice Act for the 1977 crop, including set aside and voluntary diversion. If set aside is imposed, a producer loses eligibility for deficiency payments, disaster payments, and loans unless he complies, but he may stay eligible by reducing acreages of crops other than rice. Some farmers may find it profitable to omit use of set aside and to produce without support. So long as the expected market price for rice is more than the break-even point with soybeans. a profit-maximizing rice-soybean farmer must decide between reducing soybean acreage to stay eligible for rice program benefits and planting a full acreage of soybeans but forfeiting program benefits. If the expected rice price is below the break-even point, a producer may reduce his rice acreage below what he would otherwise plant with a set-aside requirement.

If a farmer decides to omit use of set aside and plant his usual rotation, he forfeits eligibility for the program. CCC will not have to make loans or payments to this farmer, but the supply problem will not be helped either. Government costs will be reduced to an extent, but only

because it is more profitable to produce outside the program, which means that USDA loses leverage in accomplishing its program goals.

Another problem with the set-aside program is that some rice production is now on farms that do not have allotments and thus are ineligible for loans, deficiency payments, and disaster payments. A set-aside requirement is irrelevant. These producers may increase their production if set aside is imposed, if they assume that market prices will be strengthened. Even on farms with allotments, some producers may be partially excused from setting aside land if their direct payments (deficiency and disaster) are likely to exceed the payment limitations, currently $55,000.

USDA could also pay allotment holders for voluntary diversion. Such a procedure may reduce production on allotment farms, but experience has shown that the least productive acreage is idled (see the Ericksen article in this *Review*). In addition, other producers may increase their acreage further, negating any benefits. The costs would likely be high relative to the benefits.

One means for making supply controls more effective would be to distribute allotments among producers based upon current production patterns, perhaps their average acreage for the last 2-4 years. New producers and those overplanting current allotments may, with such an update, find it profitable to set aside land. Allotments would also reflect efficient production patterns.

Other types of standby controls could also help balance supplies with expected demands. Authority for USDA to increase or decrease the national allotment annually could be useful. In addition, authority to discontinue program benefits to those overplanting their allotments could aid in supply management. The suggested changes in supply control would be helpful in program administration and they may be necessary if the target prices and loan rates are not reduced. Improved means for controlling supplies might also give decisionmakers more freedom in setting the level of concessional exports, with the possibility of severely reducing or eliminating P.L.-480 exports if desired.

Loan Rates

The previous discussion indicated some of the advantages of lowering the target price. Changes could also be made in the loan program. First, the loan rate could be lowered to keep it below the reduced target price. Second, USDA could be allowed some discretion in setting the loan rate. Allowing USDA some flexibility in setting the loan rate would provide a means for adjusting the program with world market conditions. A fixed loan rate does not provide means to meet evolving economic conditions or unforeseen events. Since export markets are important to the rice industry, policymakers could use the loan rate to induce or contract supplies based upon expected exports. The flexible loan rates also could be a useful stocks management tool. A flexible loan rate may also be necessary if less dependence is to be placed upon P.L.-480 as a surplus disposal vehicle. If decisionmakers indicate more or less need for P.L.-480 in the next year, based upon food needs, the loan rate could be adjusted to indicate supply needs.

CONCLUSIONS

Several important points may be made in considering the market orientation of the Rice Production Act of 1975. First, although market conditions for rice can change drastically from year to year because of variations in world production and U.S. export demand, the current program provides little management flexibility and could necessitate substantial Government outlays. This program may cause continued reliance upon P.L.-480 as a surplus disposal vehicle. Market orientation for such a crop as rice, for which market conditions can change from year to year, would seem to require that USDA have some management flexibility to change the program to meet evolving economic conditions.

Second, current target prices appear high in relation to the prices needed to draw resources into production, and continued deficiency payments are probable. Since prices of competing commodities can vary considerably, the targets and loans will probably need to be set much lower than they are now to continue a market orientation. The lower target price would then enable provision of income support by using direct payments in the years with poor prices. Continuous support would not be offered.

Third, there would seem to be as much or more rationale for allowing USDA to restrict rice production to a percentage of allotment as there is for wheat, feed grains, or cotton. Rice prices could become depressed because of world conditions, even with a set-aside program for rice in effect, while prices of competing commodities could remain strong. Set aside may be more useful as an overall acreage control used to improve the overall prices of the major commodities in times of general surpluses. Direct controls on rice could be used in years when a rice surplus seems possible.

Fourth, acreage allotments have already become outdated in terms of current production patterns. Program management would be improved if allotments and current production patterns were in harmony.

Fifth, imposing a $20,000 payment limitation per producer for all programs including rice could cause problems, but further research is needed to evaluate the impact. Much of the rice production is on large farms. If they could receive only $20,000 from all Government commodity programs including rice, many producers could reach the maximum limit. They would then be entitled to less restrictive set-aside requirements, which would counteract the benefits of using supply control to limit production, thereby raising market prices and reducing deficiency payments.

The Rice Production Act of 1975 is a transition step toward market orientation. The experience gained in 1976

with the new legislation can enable appropriate adjustments if it is desirable for market conditions to more fully determine production, use, price, and income. Without these adjustments, Government outlays will likely remain substantial and producers' incomes will depend on U.S. Treasury outlays.

PEANUTS

The United States produces about 10 percent of the world's peanuts with production centered in the Southeastern and Southern Plains States. Peanuts are mainly consumed directly as food and crushed into vegetable oil and protein meal. Production value equals 1.4 percent of the value of the principal U.S. crops. Rapid increases in yields with constant acreage have resulted in expanded production in recent years, which has exceeded demand increases of traditional users, adding stress to the administration of the Government peanut program.

Basically unchanged since 1949, peanut legislation requires the Secretary of Agriculture to proclaim marketing quotas if supplies would be excessive without controls and to support the price at 75 to 90 percent of the parity price unless quotas are disapproved.[2] Marketing quotas have been proclaimed and approved for every year since 1949, resulting in national acreage allotments at or above the allowable minimum of 1.61 million acres. In recent years, Government outlays have become considerable, causing pressure for new legislation to bring the crop closer to market reality and reduce Treasury costs.

SUPPLY

Peanuts are an important crop in a limited number of States and extremely important to areas within these States. The Southeastern region centered in Georgia produces 64 percent of the U.S. total, followed by the Southwest with 19 percent and the Virginia-North Carolina area (V-C) with 17 percent (table 4). Peanuts contribute only 6.9 percent of the value of production of the principal crops in the three regions, but peanuts are extremely important to some areas within these regions.[3] Georgia, with 45 percent of U.S. peanut production in 1975, is the largest producing State, followed in order by Alabama, Texas, and North Carolina. There are about 75,000 peanut allotment farms but a lower number of producers, because some producers operate more than one allotment farm.

Production costs vary widely among the three regions (table 5) (*4*). Variable costs for 1976, using the midpoint of Krenz's yield ranges, average from a low of 6.9 cents per pound in the Southeast to a high of 9.1 cents in the Southwest. Cost totals, which include variable, machinery ownership, and overhead but exclude land and management, range from 8.6 cents in the Southeast to 11.8 cents in the Southwest with a weighted national average of 9.6 cents. The difference between the estimated costs and the support price for 1976 (20.7 cents per pound) indicates the high returns currently being made in the industry.

It is extremely difficult to estimate a supply curve for peanuts, because production for three decades has been

[2]See (*10*) for detailed descriptions of the program and peanut production and uses.

[3]Sprott (*7*), with an input-output analysis of the Texas west cross timbers region, shows that severe economic problems would likely be encountered, for at least one region, if a change in the peanut program leads to a significant reduction in acreage.

Table 4—Peanuts: production volume and value by State, 1975

State and region	Production	Value	Value of principal crop production	Value of peanut production relative to that of principal crops
	Million pounds	*Million dollars*	*Million dollars*	*Percent*
Alabama	536	105	556	18.9
Florida	178	35	1,438	2.4
Georgia	1,727	342	1,108	30.9
Mississippi	13	3	772	0.4
South Carolina	29	6	569	1.1
Southeast Region	2,483	491	4,443	11.1
North Carolina	374	75	1,675	4.5
Virginia	284	56	572	9.8
VA-NC Region	658	131	2,247	5.8
New Mexico	20	4	206	1.9
Oklahoma	232	45	926	4.9
Texas	464	86	3,160	2.7
Southwest Region	716	135	4,292	3.1
Ten States	3,857	757	10,982	6.9
United States	3,857	757	55,694	1.4

Source: *Field Crops*. Crop Rptg. Bd., Statis. Rptg. Serv., U.S. Dept. Agr., May 4, 1976.

Table 5—Peanuts: selected production costs for major producing regions and U.S. average, projected for 1976[1]

Item	Region			United States
	Virginia-North Carolina	Southeast	Southwest	
	Cents per pound			
Variable costs	8.4	6.9	9.1	7.6
Machinery ownership	1.2	1.1	2.1	1.3
General farm overhead	.6	.6	.5	.6
Total	10.2	8.6	11.8	9.6

[1] Based on the midpoint of the yield range as given in the source. Totals may not add because of rounding.

Source: (*4*).

largely controlled by the current Government program. Resources are apparently available in the current producing areas to support a considerable expansion in peanut acreages under favorable conditions (*6*). Acreage could probably double in the Southeast and V-C areas, but the potential in the Southwest is harder to evaluate because of more diverse conditions. The doubling of current acreage would result in a planted area similar in size to that planted at the time of World War II. Potential peanut acreage outside current producing areas is unknown, but expansion into new areas would require substantial investments by producers and for a supporting processing industry.

DEMAND

There are three markets for U.S. peanuts, each with different demand schedules and elasticities. The largest and most inelastic market, the domestic edible or food market, has increased steadily but more slowly than production. From crop years 1955/56 to 1959/60, domestic edible use averaged 67 percent of production (table 6), but it dropped to half of production in 1974/75 and 1975/76. Estimating the price elasticity of demand for this market is extremely difficult, because prices for edible uses have always been about equal to the support rate with very little year-to-year fluctuation. Estimates of the price elasticity of demand for farmers' stock peanuts in

Table 6--Peanuts (farmers stock basis): U.S. acreage, supply disposition, and price (crop year beginning in August)

Item	Unit	1965	1971	1972	1973	1974	1975 (preliminary)
Acreage:							
Allotment[1]	1,000 acres	1,613	1,613	1,613	1,612	1,612	1,614
Planted	Do.	1,520	1,529	1,533	1,530	1,520	1,532
Harvested for nuts	Do.	1,438	1,454	1,486	1,496	1,472	1,504
Percentage harvested	Percent	94.6	95.1	96.9	97.8	96.8	98.2
Yield per acre harvested	Pounds	1,661	2,066	2,203	2,323	2,491	2,565
Supply:							
Beginning stocks, August 1	Million pounds	373	453	392	429	553	[2] 1,146
Production	Do.	2,390	3,005	3,275	3,474	3,668	3,857
Imports[2]	Do.	1	2	2	1	1	1
Total supply	Do.	2,764	3,460	3,669	3,904	4,222	5,004
Disposition:							
Total edible use	Million pounds	1,445	1,623	1,694	1,840	1,800	1,900
Per capita edible use	Pounds	7.4	7.9	8.2	8.8	8.5	9.0
Crushings	Million pounds	517	814	850	683	590	1,450
Seed, feed, and loss	Do.	152	79	175	119	−54	54
Total domestic disappearance	Do.	2,114	2,516	2,719	2,642	2,336	3,404
Exports	Do.	238	552	521	709	740	450
Total disposition	Do.	2,352	3,068	3,240	3,351	3,076	3,854
Price:							
Parity	Cents per pound	14.5	17.9	19.0	21.9	24.4	26.3
Support	Do.	11.2	13.4	14.3	16.4	18.3	19.7
Percentage of parity	Percent	77	75	75	75	75	75
Season average price to farmers	Cents per pound	11.4	13.6	14.5	16.2	17.9	19.6
Value of production	Million dollars	272	408	475	562	658	757
CCC operations:							
Acquisitions[4]	Percent	28	39	36	25	26	26
Losses[5]	Million dollars	46	[6] 97	[7] 55	4	121	211

[1] National minimum acreage allotment under existing legislation. [2] Includes 644 million pounds of commercial peanut stocks and 502 million pounds of CCC stocks contracted for crushings. [3] Import quota. [4] Percentage of crop. [5] Net outlays from peanuts surplus disposal programs. [6] Excludes $15 million CCC costs of peanut butter purchases. [7] Excludes $2 million CCC costs of peanut butter purchases.

edible uses are all inelastic and range from -0.043 to -0.46 (see (6) for a summary of previous studies).

Export markets have absorbed considerable quantities of U.S. peanuts but generally at a loss to CCC until program changes were made for 1974/75. Losses on peanuts exported occurred, though most of the peanuts exported were of the highest quality, because world prices have generally been below U.S. support levels. The export edible market is about a third as important as the domestic edible sales. The export market is probably inelastic, at least in the short run, but less so than the domestic market because of the availability of alternative supplies from other exporters.

The most elastic market for U.S. peanuts is for peanuts sold for crushing domestically or abroad. Some of the peanuts crushed have been the lower grade nuts sorted out from those used in the edible markets. The value of the oil per pound of peanuts crushed is traditionally more than twice that of the meal. Demand for peanut meal is highly elastic (nearly perfectly elastic), because the meal can be substituted for other protein sources. Also, a small quantity of peanut meal is produced relative to the total of all meals. Peanut meal prices have generally remained slightly lower than soybean meal prices.

Peanut oil has special characteristics, mainly a high-temperature smoke point, that differentiate it from other vegetable oils. As a result, peanut oil has commanded a premium over soybean oil, the most important U.S. vegetable oil. However, demand for peanut oil by users that require the special properties is somewhat limited. If more peanut oil is available than needed for such demand, it substitutes for other vegetable oils. To substitute, the price differential must narrow or disappear.

In limited quantities peanut oil can command a substantial premium, as witnessed in the last 2 years when it has sold at a premium of 10 to 12 cents. However, as peanut oil becomes more abundant and the specialized uses are filled, the price differential approaches zero and, with excessive supplies, may become negative. Peanut oil is therefore relatively price inelastic when supplies are limited, but it becomes highly elastic when enough is produced to require substitution for other vegetable oils. If enough peanut oil were produced, the level of soybean oil prices might also fall. Up to now, the level of peanut oil production has probably not had more than minor impacts on the general level of soybean oil prices.

The demand for peanuts for crushing is a derived demand; the demand curve for crushing peanuts is a vertical summation of the separate demands for peanut oil and meal.[4] A crusher can pay an amount equal to the value of the oil plus the value of the meal minus processing costs and the necessary profit margin. Since peanut oil and meal are substitutable and their prices closely related to those of other vegetable oils and protein meals, the demand for crushing peanuts is largely determined by the prices of the predominant substitutes—soybean oil and meal.

Combined demand for peanuts for all uses, domestic edible, export edible, and crush is a horizonal summation of the three separate curves. The overall demand schedule probably has inelastic and elastic ranges with the elasticity increasing towards the right. The inelastic parts would be associated with the quantities used in the edible markets, domestic and export, and for limited quanties going to crush. The current level of production is probably in the highly elastic range, since production considerably exceeds use in the edible markets. The price that would be received by farmers under a market-oriented program would depend on where the supply curve intersected with the aggregate demand curve. This price would be equal to the marginal, or lowest value, use which is currently in effect for crush. So long as the crushing market remained the marginal use, the target price in a market-oriented program would have to be set at or below the usual crushing value. This concept is important to the analysis in a later section.

PEANUTS AND A TARGET PRICE PROGRAM

The implementation of a market-oriented program could substantially alter peanut production, use, prices, and Government costs. With the apparently large acreage available, peanut production could be expanded if demand were adequate to keep the price high enough to provide returns above those of competing crops. However, weak demand could result in transfer of acreage from peanuts to other crops or uses. Since previous research has not adequately identified supply or demand relationships, we need now to consider the production, use, and prices that are likely to occur with a market-oriented target price program through less formal means. This analysis focuses on the next 1 to 5 years with no attempt to project longer run events.

Studying the competitive relationship between peanuts and other crops may substitute for estimating an aggregate supply curve. With the same break-even price for peanuts and competitive crops, large acreages with potential for producing peanuts would make supply highly elastic under a market-oriented program. The equilibrium price of peanuts would then be expected to be at or near the break-even points. Demand at this price can be used as an estimate of production.

Peanut supplies probably would be elastic in both the Southeast and the V-C regions. In the Southeast, supply should be elastic at a price which allows the average producer to break even with soybeans, the most important substitute crop. Corn and soybeans are the main competitors for resources with peanuts in the V-C area. In recent years, the price at which peanuts would break even with corn has been about the same as the price at which

[4]The demand for crush is similar to that for soybeans. See (3) for a description of the derivation of the demand for soybeans for crush from separate oil and meal schedules.

it would give equal returns with soybeans. Corn is used in the following analysis. The heterogeneity of the Southwest region makes its supply less elastic. Resources vary considerably. Irrigation is required for part of the production and a number of possible alternative crops among the subregions. Indications are that the break-even price for much of the potential peanut production in the Southwest is higher than that for the Southeast and V-C regions. With a market-oriented program, production would contract from present levels.

Break-even Prices

Two sets of break-even prices for the Southeast and V-C areas have been calculated (table 7). These figures are based upon projected 1976 costs and yields. The shortrun break-even price indicates the peanut price needed to provide returns higher than variable costs, and the longrun break-even price represents the price needed for returns above variable, machinery, and overhead costs. When priced at about 9 cents per pound, peanuts in the Southeast would return an amount above variable costs equal to that which soybeans would give at $5.50 per bushel. For soybeans to return the same amount above variable costs as the 1976 peanut support price (19.7 cents per pound after deducting for grading, handling, and storage), soybeans would have to sell for an extremely unlikely $19 per bushel. Peanuts at 9.7 cents in the V-C area return the same amount above variable costs as corn at $2. With peanuts in the V-C area at the national average peanut loan rate (20.7 cents), the break-even price for corn is $5.81. In both areas, the longrun break-even price for peanuts is slightly higher than in the short run, about 0.9 cent higher in the Southeast and 0.6 cent in the V-C region. These figures do not account for the higher production costs per acre for peanuts which would justify higher per acre returns for assuming the risks of purchasing additional inputs. These added risks would raise the effective break-even prices somewhat above those shown in table 7.

By estimating the likely prices of corn and soybeans during the next few years, we can observe the appropriate break-even rices for peanuts. Soybean prices ranged from $4.75-$6.00 per bushel and corn prices from $1.75-$3.00 during most of the time in the past several years; and these prices seem relevant for the next several years. These prices indicate a break-even price for peanuts (short run or long run) at 9 to 11 cents per pound in both the Southeast and V-C regions without risk considerations. Subjectively adding for the higher risks of peanut production would give a break-even price and expected equilibrium market price of 11-13 cents.

With a likely equilibrium price in the range of 11-13 cents per pound, well below the current support level, one might think that enough movement along the demand curve would result to allow a substantial expansion in the peanut industry if a new program were enacted. Because of the inelasticity of the edible markets, most of the expansion would have to be absorbed in the crushing market. Only if the crushing markets are adequate to support the price at or above the break-even level can significant expansion occur in peanut production in the next several years. Otherwise, production may have to contract or slowly expand at the rate of increases in edible uses. Projected crushing demand is therefore critical to the industry in a market-oriented situation.

Projected Crushing Value

As indicated, the quantity of peanuts available for crush and the prices of soybean oil and meal would be the most important variables in establishing the crush price. Consideration will first be given to the prices likely at the quantity of peanuts crushed before 1974/75, when administrative program provisions for the disposal of sur-

Table 7—Peanut price needed to equate per acre returns above variable costs and above all costs with competing crop, two regions, 1976[1]

Southeast region			Virginia-North Carolina region		
Expected price of soybeans	Peanuts break-even price		Expected price of corn	Peanuts break-even price	
	Short run[2]	Long run[3]		Short run[2]	Long run[3]
Dol./bu.	*Cents/lb.*		*Dol./bu.*	*Cents/lb.*	
4.50	8.3	9.2	1.50	([4])	([4])
4.75	8.5	9.4	1.75	9.0	([4])
4.90	8.6	9.5	2.00	9.7	10.3
5.50	9.0	10.0	2.25	10.4	11.0
6.00	9.4	10.4	2.75	11.8	12.4
6.50	9.8	10.7	3.25	13.3	13.9
18.75	18.7	19.7	5.29	19.1	19.7
20.08	19.7	20.7	5.50	19.7	20.3

[1] Costs for peanuts and soybeans are based on (*4*). Corn estimates are updates from *Costs of Producing Selected Crops in the United States-1974*, Senate Committee Print 63-092, Gov. Print. Off., Washington, D.C., 1976. [2] Shortrun break-even price equates returns above variable costs. [3] Longrun break-even price equates returns above variable, machinery ownership and overhead costs. [4] Returns are negative.

pluses were changed.[5] Alternative levels of soybean oil and meal prices are used, based on normal historical differentials between peanut and soybean oils and between peanut and soybean meals.

To estimate "normal" differentials between peanut and soybean oils and meals, data since 1960 are considered. From 1960 to 1973, the price of peanut oil had yearly averages ranging from 2.1 to 7.4 cents per pound above that of soybean oil. The average peanut oil premium during 1960-73 was 4.3 cents, or 39 percent above the soybean oil price. Peanut meal prices have not been reported regularly since 1971, but during 1960-71, peanut meal prices averaged $4 per ton less than soybean meal ($79 and $83, respectively) with less year-to-year variability than the peanut-soybean oil relationship.

By applying the average of these differentials, crushing values at the alternative oil-meal prices can be estimated. Soybean oil prices at 16 cents per pound along with soybean meal at $150 per ton is consistent with $4.90 per bushel soybeans at the farm. Using these prices and applying the average differentials used earlier would imply 21-cent peanut oil and $145-per-ton peanut meal. The total value of peanut products from crush would be 10.3 cents per pound, farmers' stock basis.[6] Subtracting an assumed margin of 1.5 cents for storage, transportation, and processing leaves a farm value of 8.8 cents. Such a price is below the average break-even price for peanuts with other crops in both the Southeast and V-C and below the direct plus overhead costs of production outside the Southeast. This price is too low to support production, which would be expected to decline. As a result, crush would decline below the 1969-73 average level, strengthening prices to the break-even level.[7]

Increasing these assumed oil-meal prices would give a higher crushing value. Pricing peanut oil at 26 cents per pound (soybean oil at 20 cents) and peanut meal at $195 per ton (soybean meal at $200) gives a crushing value for peanuts of 13.1 cents. Subtracting 1.5 cents for a crushing margin gives a farm price of about 11.6 cents. But with these oil and meal prices, soybean prices would probably rise to about $6.50 per bushel. This higher soybean price would push up the break-even price for peanuts to perhaps 12-14 cents per pound with the higher risks of peanut production included. Such a crushing price may be adequate to support peanut production so that the 1969-73 volume of crush could continue. However, this speculation depends upon whether the soybean price of $6.50 per bushel is an equilibrium level and can be maintained. If soybean oil and meal prices cannot stay high enough to keep soybeans near $6.50, peanut oil and meal prices would also likely drop. The result would be a peanut crushing value of less than 11.6 cents, again indicating a drop in crush from 1969-73 levels.

The preceding analysis was based upon historical crushing levels and price relationships. However, considering (1) the volume of crushing peanuts which would have been available in 1974-75 if the CCC disposal policy had not been changed and (2) the volume likely to be available in the next few years, peanut oil supplies could easily reach 500 million pounds per year. The price of peanut oil would likely be depressed to near that of soybean oil. Peanut oil prices of 20 cents per pound (soybean oil also at 20 cents) with peanut meal prices of $195 per ton (soybean meal at $200) are consistent with a peanut farm price of about 8.5 cents, an unprofitable level. Thus, crushing price could not remain high enough to maintain the current level of production even with $6.50-per-bushel soybeans (20-cent soybean oil and $200 meal), and it further indicates the likely drop in production under market-oriented legislation.

Thus, peanut production may have to contract sufficiently in a market-oriented situation from 1974-75 levels for the domestic crush market to be at a lower level than in recent years. A cutback in crush would lead to an increase in the spread between peanut oil and soybean oil prices so that peanut prices would reach break-even levels. Since the edible and export markets may expand, the decrease in production would not have to be so large as the decline in crush. Production of about 3.2 billion pounds in 1978-81 would be consistent with the indicated relationships in a market-oriented program, which would be about 30 percent below the production expected if the current program is continued.

Moving to a market-oriented program with a target price and support rate at or below the 11- to 13-cent expected market prices could cause substantial problems in the industry, at least for a few years. There could be instability in production, prices, incomes, and utilization. Returns above direct production costs and general farm overhead from peanut production with the 11- to 13-cent market price (and a Government program with an 11-cent target price and 8.8-cent loan) could equal about $125 million per year during 1978-81. This total compares with an expected $675 million if the current program is continued. Such an income drop overstates the losses to producers, since allotment rentals would be eliminated and the acreage transferred from peanuts could earn a return from some other enterprise.

If the results likely from moving directly to a market-oriented program in 1978 would be unacceptable, transition steps could be used, at the expense of continued

[5]Domestic crushings from 1969/70 to 1973/74 averaged 745 million pounds farmers' stock basis per year. Peanut oil production and exports averaged 236 million pounds and 64 million pounds, respectively, in 1969/70-1973/74. Because of the rapid increases in yields, and, therefore, production, crush could easily double the 1969-74 average during the next few years under the current program.

[6]A crushing yield of 34.4 percent oil and 43 percent meal is assumed.

[7]Niewoudt (6) indicated a likely increase in production with a market-oriented program based upon 1973 data. The analysis bases the crushing value for peanuts upon the abnormally high 1973 cottonseed price. Peanuts could profitably be grown for crush in substantial volume with such prices as those in 1973/74. His analysis would not have shown the expansion in crush if a more recent cottonseed price had been used.

Government involvement. The target rates could be raised above the expected market price so that deficiency payments would support incomes. Government losses under this type of policy would depend more upon the level of allotment than the target price. Government costs with the current allotment level, 1.6 million acres, and a 15-cent target price and 12-cent loan, could reach $275 million in 1978 and sustain a higher level production than with a market-oriented program. Cutting the allotment back to 1 million acres with a 15-cent target price would probably cut production about 20 percent compared with the 1.6-million-acre allotment and Government costs of about $50 million.

The analysis suggests that a market-oriented peanut program will likely entail decreased prices and production. However, the lack of market orientation in the current program makes it extremely difficult to place a high level of confidence in any specific estimates of prices and production with a market-oriented program. Many growers and communities could be hurt substantially by the required changes. Trade-offs can be made between protecting the beneficiaries of the current program (producers, the supportive industry, and allotment holders) and those who could gain from market-oriented legislation (consumers, taxpayers, current allotment renters, and new producers). But trade-offs are almost certainly involved. A transitional program could smooth adjustments and perhaps induce less instability, but Government outlays would likely be needed to finance the adjustment period.

This analysis did not consider longer run events. A market-oriented program with its lower prices could lead to an expanded demand with time to develop new products and markets. The peanut has already shown its usefulness in a wide variety of products, but the potential might be much greater if production and use could adjust with market conditions.

ELS COTTON

Two separate Government programs for cotton are in effect in the United States, one for upland cotton and the other for extra long staple (ELS) or American Pima Cotton. ELS cotton production in 1973-75 averaged 75,000 bales, only 0.7 percent of the upland production. And the value of ELS production for the same period averaged $27 million, compared with $2.4 billion for upland cotton (table 8). In 1976, 56,000 acres were planted to ELS cotton, compared to 11.7 million acres of upland cotton.

Three States produce almost all of the ELS cotton in this country. Arizona, with 30,000 acres harvested in 1975, is the largest producer. Texas harvested 24,000 acres; and New Mexico, 12,000 acres. Much of the production is on farms with small ELS cotton allotments, and most of the growers also produce upland cotton, the most important alternative crop on ELS cotton farms.

Imports of ELS cotton have met a substantial share of domestic needs in some years but they have varied highly from year to year. In the last decade, imports peaked at 92,000 bales in 1967/68 and dropped to a low of 10,000 bales in 1974/75.[8]

A major disadvantage to ELS cotton production is its low yield. The yield ratio between the two types of cotton varies from year to year and among producing areas, but ELS cotton usually yields about three-fifths as much as upland cotton. The per acre costs of production for the two cotton types are not significantly different. Special ginning equipment is required for ELS cotton, which costs more per pound to process, but fewer pounds per acre are ginned. Somewhat lower applications of fertilizer per acre may be required for ELS cotton, tending to lower its production costs, but the total costs per acre

[8]Imports exceeded the quota of 85,600 bales in 1967/68, partly because import data are not adjusted to the August 1-July 31 marketing year. The figure may also include 6,000 bales or more of cotton stapling less than 1-3/8 inches.

Table 8—Extra long staple cotton, production, use, and prices
(Crop year beginning in August)

Item	Unit	1970	1971	1972	1973	1974	1975	1976
		Production and disposition						
Allotment	1,000 acres	78	118	118	118	118	91	84
Harvested acreage	Do.	75	101	96	83	82	66	
Yield per harvested acre	Lb./acre	369	466	480	451	526	397	
Production	1,000 bales	57	98	96	78	90	56	
Imports	Do.	26	30	11	22	10	56	
Domestic use	Do.	99	96	99	88	63	92	
Exports	Do.	12	9	5	12	12	11	
		Prices and support levels						
Loan rate	Cents/lb.	40.50	38.40	38.50	38.20	49.72	67.74	73.24
Direct payments	Do.	9.29	12.69	12.85	16.01	10.86	6.36	1.51
Price received by farmers	Do.	43.3	44.8	44.9	87.2	64.4	73.7	
Value of production	Mil. dol.	11.9	21.1	10.7	32.7	27.9	19.7	

remain about equal. Since per acre production costs are not significantly different but ELS cotton yields are lower, ELS cotton has a higher cost of production per pound, necessitating a higher market price to remain competitive. The future of ELS cotton may hinge upon yield breakthroughs, allowing it to compete better with other crops, much more than on any changes in the Government program.

The acreage planted to ELS cotton has varied considerably, reaching a post-World War II annual high of 144,000 acres in 1963 and a low of 1,500 acres in 1947. Since 1971, acreage has been on the downswing, dropping from 102,000 acres to 56,000 in 1976. Farmers have planted well below their allotments since 1971, indicating that the higher price has not been enough to compensate for the relatively low yields. Plantings dropped from 87 percent of allotment in 1971 to 67 percent in 1976, even though the alloted acreage was lowered by 34,000 acres.

The ELS cotton price for 1960-75 averaged 176 percent of the upland cotton price; the ratio ranged from a low of 151 percent in 1974/75 to a high of 236 percent in 1966/67. The price of ELS cotton is highly correlated with that of upland cotton; the correlation coefficient (r) for 1960-75 was 0.91. Higher prices for ELS cotton are needed to offset the lower yields and they can be justified only through higher value uses.

THE GOVERNMENT PROGRAM

The program for ELS cotton since 1968 has been, in some respects, similar to the current upland cotton program of combining price support through loans with direct payments. The ELS cotton program remains tied to the parity concept and it relies upon marketing quotas and mandatory acreage allotments. Price support through loans must be offered for ELS cotton at between 150 and 200 percent of the loan level for upland cotton. A direct payment from the CCC must be made if the support level is less than 65 percent of the parity price so that the loan level plus direct payment rate equals the minimum 65 percent of the parity price. There is no payment limitation per producer. The direct payment for each farmer depends upon his actual production and it may be for less than 100 percent of his crop. A major difference from the upland cotton program is the requirement that a direct payment, if announced, must be made regardless of market prices.

The practice currently followed by USDA is to make the loan level as high as possible to reduce the direct payment. This measure is consistent with attempts to make the program as market oriented as possible by having payments to producers originate with users instead of taxpayers. Season average prices have remained well above loan levels since the 1971/72 crop year. The direct payment was at a high of 16 cents per pound in 1973 but it will only be 1.5 cents in 1976. Government outlays including direct payments, P.L.-480, and costs of loan activities averaged $3.5 million for 1971-75 crops. The P.L.-480 outlays averaged $680,000 per year in that period.

A NEW PROGRAM

ELS cotton is currently being produced and consumed with only minimal direction from the the Government program, since planted acreage has been less than the allotment and prices have remained above loan levels. However, conditions for this crop have changed rapidly in the past and they could do so again. Tight acreage restrictions and other controls could become necessary, and Government program provisions would have major impacts upon supply and demand. In addition, direct payments have been required under the current program, even when market prices have been well above 65 percent of the parity price. For these reasons, consideration may be given to changing the ELS cotton legislation.

The relative unimportance nationally of the crop and the overhead costs of administering a program first suggest the question of whether any program is needed. It requires nearly equivalent resources to formulate the ELS cotton program as it does for the upland cotton program, even though ELS cotton is a much less important crop. One possibility of phasing out the ELS cotton program would be to substitute upland cotton allotments in place of ELS cotton allotment, since most producers grow both crops. Growers could be given an acre of allotment for upland cotton in place of each acre of ELS cotton allotment, or the ratio could be set at other than one for one.

If decisionmakers indicate that a separate program for ELS cotton should be maintained, a transition to a market-oriented target price program could probably be made at this time without difficulty. The new program could be based upon the historical price relationships between ELS and upland cotton crops. Proposals have been made in the Congress and elsewhere for a new ELS cotton program with target prices and loan rates set as a percentage of those for upland cotton. Without evaluating the specific proposals, such a program could be based on historical economic relationships between the two types of cotton. The Government would not make direct payments so long as the market price remained above the target level. The current market orientation of ELS cotton would continue so long as the upland cotton industry remained in a market-oriented situation and the price relationships between target and loan rates for upland cotton did not change. Since the relationships could change, a strong argument could be made for allowing some flexibility in setting loan and target prices in relation to upland cotton. To maintain consistency, the set-aside and other supply controls available for administering the upland cotton program could also be included in new ELS cotton legislation.

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LIVESTOCK-GRAIN INTERDEPENDENCE: IMPLICATIONS FOR POLICY

By
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ABSTRACT

The interdependence between grain and livestock production calls for grain policies which will result in stable and reasonably priced inputs for livestock production. This article outlines the basis of the interdependence and the relationship betweeen grain and livestock supply response.

Increased grain price variability in the 1970's has caused instability in the livestock industry. Stabilization of grain prices in a range acceptable to both grain and livestock producers could lead to a more desirable allocation of resources, thus improving performance.

KEYWORDS Livestock-grain interdependence, livestock, agricultural policy.

INTRODUCTION

Domestic livestock and meat production is closely linked to feed grain production. Thus, policies affecting the grains sector of the agricultural economy have implications for livestock producers. Livestock and poultry production had been closely connected with feed production on individual farms before commercial feeding operations became popular. In policy formulation and program design for the grains sector, little attention was accorded the livestock sector. Structural changes in recent years have resulted in meat production by an expanding, more concentrated, and highly specialized livestock sector. The increasing specialization and growing interdependence of the grains-livestock sectors have been heightened by events since 1970.

Traditional uncertainties affecting the livestock sector have stemmed from economic and biological factors including:

(1) An inelastic demand;

(2) An inelastic supply subject to biological constraints;

(3) Pronounced cycles due to biological and economic phenomena; and

(4) Variability in feed supply and price due to weather variability.

Depletion of substantial grain reserves in the early seventies and the increased importance of exports fom expanding world demand have accentuated the traditional economic uncertainties.

Prior to the early seventies the livestock industry operated with a stable and moderately priced feed grain supply. Much of the feed grain supply remained in the domestic market and the livestock sector was the primary consumer (table 1). During the early seventies the situation changed. U.S. reserves were depleted in response to increased export demand arising from poor world weather conditions and increased incomes in developing countries. The United States assumed an expanded role as the primary supplier of grains for food and feed. The livestock sector was consequently forced to become a residual feed claimant after the export market. Although the livestock sector was still the largest consumer of the domestic grain supply, the export market largely determined prices and dominated policy considerations. The U.S. livestock industry is now a price taker and prices for the domestic

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Table 1.—Feed grains: Marketing year supply, disappearance, acreage, and prices, 1969-76[1]
(adjusted for July 1 to June 1 shift in grain stocks reporting)

Year[2]	Supply				Disappearance					Ending stocks		
	Beginning stocks	Production	Imports	Total	Domestic use: Feed	Domestic use: Food, industry and seed	Domestic use: Total	Exports	Total disappearance	Privately held	Government[3]	Total
	Million short tons											
1969/70	50.2	177.4	0.4	228.0	141.8	16.4	158.2	21.2	179.4	NA	NA	48.6
1970/71	48.6	160.1	.4	209.1	138.9	16.3	155.2	20.7	175.9	NA	NA	33.2
1971/72	34.7	207.7	.4	242.8	149.6	16.1	165.7	27.1	192.8	NA	NA	50.0
1972/73	50.0	199.9	.5	250.4	156.4	17.0	173.4	43.1	216.5	NA	NA	33.9
1973/74	33.9	205.0	.2	239.1	153.3	17.6	170.9	44.5	215.4	NA	NA	23.7
1974/75	23.7	165.3	.5	189.5	115.6	17.7	133.3	39.4	172.7	NA	NA	16.8
1975/76[4]	16.8	202.4	.5	219.7	127.8	18.1	145.9	54.7	200.6	NA	NA	19.1
1976/77	19.1	201.7	.4	221.2	132.6 (+,-5)	18.8	151.4 (+,-5)	51.6 (+,-4)	203.0 (+,-4)	NA	NA	18.2 (+,-10)

	Acreage				Yield	Seasonal index	Government price support operations
	Base or allotment	Set-aside	Planted	Harvested for grain	Per harvested acre	Price received by farmers[6]	Total payments to program participants
	Million acres				*Short tons*	*1967=100*	*Million dollars*
1969/70	133.0	39.1	115.3	95.5	1.86	97	
1970/71	133.0	37.4	118.8	99.3	1.61	110	
1971/72	132.9	18.2	128.0	106.3	1.95	96	1,060
1972/73	129.8	36.6	115.1	94.0	2.13	142	1,865
1973/74	130.0	9.4	121.4	102.4	2.00	225	1,171
1974/75	89.0	---	122.5	100.6	1.64	251	[8]328
1975/76[4]	89.0	---	123.1	104.8	1.93	[7]220	[8]114
1976/77	89.0	---	129.3	106.8	1.89	[7]201	

[1] Aggregated data on corn, sorghum, oats and barley. [2] The marketing year for corn and sorghum begins Oct. 1; June 1 for oats and barley. [3] Under loan to or owned by CCC; not available. [4] Preliminary. [5] Estimate. [6] Excludes support payment. [7] October, 1976. [8] Disaster payments.

NA means not available.

grain supply are set at the margin. Marginal sales in recent years have been exports which bid up the price of grain for all users. The livestock industry has thus seen fluctuating grain supplies and prices which preclude normal planning, production, and operating decisions in the short and intermediate run, and pose difficulties for long-run capital investment planning.

This situation has prompted recent suggestions for more explict consideration of the livestock industry in grains policy formulation. The purpose of this article is to examine the nature of this strong and growing sectoral interdependence and to discuss considerations important to an expanded grains policy. First, structural changes in the livestock-grain sector, biological factors, and general economic considerations are examined. Then the new uncertainties of the seventies and factors important to expanded agricultural policy considerations which include the livestock sector are discussed.

STRUCTURAL, ECONOMIC, AND BIOLOGICAL CHARACTERISTICS

STRUCTURAL CHANGES

Most agricultural production occurred on diversified general crop-livestock farms before the midfifties. These were typically the smaller, labor-intensive, family farms. The major degree of livestock specialization was feeder cattle production in the grain deficit range areas, and cattle feeding in the grain surplus North Central States. As the seasonal grass supply was depleted in the fall, feeder cattle were shipped to the grain surplus areas for feeding during the noncropping winter months. Fed cattle sales were typically timed to avoid competition with the crop enterprises, especially spring planting. On many farms with joint enterprises the operations were sufficiently diversified to allow for flexibility of operations in extreme situations. If grains were in greater demand and higher priced, the livestock enterprise was reduced. Conversely, low grain prices provided stimulus for expanding the livestock

enterprise and increasing marketing weights.

A structural change that began in the fifties increased rapidly in the late sixties. Large, highly specialized feedlots (by standards of the fifties) began to develop in the Southwestern States of California and Arizona. Development occurred in this area due largely to a strong demand for beef and a grains policy which provided ample feed supplies at moderate and stable prices. Similar growth occurred in the Midwest hog sector but to a far lesser extent. These new specialized feeding operations were dependent on cash grain and feeder cattle operations for their inputs. Large fluctuations in either feed, feeder cattle, or fed livestock prices had marked effects on their profit margins. However, rising consumer incomes contributed to expanding demand for meat both in terms of higher quantity and quality and made development of large commercial feeding operations attractive.

Fed livestock production and a stable grain supply were further aided by rapid technological advancement and specialization in the feed grain sector. Under a stable and increasing domestic demand for feed grain, many of the general operators were specializing in cash grain production and expanding that enterprise. In addition, the development of hybrid grain sorghums and irrigation in the High Plains further increased grain production.

These large feeding enterprises continued to expand both in number and in size from the Southwestern States into the Plains and Corn Belt until the early seventies. Cyclical overproduction and shortrun variability in grain supplies due to weather were the primary uncertainties. Exports seldom exceeded 20 percent of the grain crop, and shortfalls were easily met with existing reserves. Commercial cattle feeders (owning lots of 1,000 cattle or more) continued to expand production until 1973, when they comprised only 1 percent of the total number of feeding operations but accounted for 65 percent of the fed cattle marketed.

ECONOMIC CONSIDERATIONS

The demand for agricultural products is price inelastic; that is, price changes are proportionately greater than related quantity changes.Purchasers of agricultural products demand well-defined quantities. As shortages develop or demand expands, prices escalate as purchasers compete for the limited quantities. Alternatively, as surplus supplies develop or demand contracts, prices decline—often sharply—to encourage increased consumption. Facing an inelastic demand, agricultural producers typically find incomes rising in periods of tight supply or increasing demand. Their incomes fall as supplies increase above desired levels or as demand contracts, forcing price reductions that are proportionately greater than the increased quantities consumed.

Income elasticity of demand for agricultural products is also low. As incomes rise, consumption of food increases until a satisfying point is reached. Beyond this point, consumers may attempt to improve the quality of their diet as incomes rise by varying the mix of food products. But total consumption levels remain relatively stable. Therefore, increased consumption in the United States is largely a function of population growth and shifts in tastes and preferences.

Price elasticities differ somewhat between grain and livestock products. The demand for grain is highly inelastic. Therefore, consumption levels vary only slightly despite wide price fluctuations. Hence, when supplies fluctuate, the price changes become very volatile. The demand for meat, though inelastic, is less inelastic than many other agricultural products. It exhibits less dramatic price fluctuations than do grains, for example. However, fluctuations in meat supplies still induce large swings in prices, and consequently incomes, due to the inelastic demand. Livestock products also have a higher income elasticity of demand than grains. As incomes rise, consumers desire to increase the proportion and quality of meat in their diets. Beef and, to a large extent, chicken have been beneficiaries of the higher income elasticities.

BIOLOGICAL CONSIDERATIONS

Short-term supplies of livestock and grain products are largely controlled by biological considerations. This causes agricultural supply to be typically inelastic in response to price, particularly in the short run. The livestock sector's response in the short run is further affected by the length and segmentation of the production process. However, given sufficient time, response is normally strong to changes in demand from both sectors. Supplies in the given sector are largely dependent on profit incentives, producer confidence and expectations, and weather conditions. However, without large reserves supplies can only be changed significantly on an annual basis. In other words, shortages cannot be filled until next year's crop is harvested and the delay is even longer for livestock.

Supply response in the livestock sector is especially complex. In the short run the supply of livestock products can be increased by feeding to heavier weights or by slaughter of the breeding herd which reduces the potential for future production. In the longer run, increased production is limited because of the biological process. Lengthy lags exist between the time expansion decisions are made and when increased production becomes a reality; it can take up to 4 years.

The expansion phase of the hog cycle may take 2 years: breeding and gestation; growth; enter the breeding herd; breeding and gestation; and finally growth, breeding and slaughter. Pigs are born after a gestation period of 4 months; growth to weaning and a feeding period will add another 6 months before slaughter or breeding herd maturity. Expansion cycles for cattle are even longer. Gestation is 9 months and the time from birth to weaning to feedlot and then slaughter is another 18 months for a total of 27 months. Since heifers are typically not bred until they are 1-2 years of age, the full expansion takes 3-4 years or longer. In addition, this expansion of the breeding herd reduces the supply of meat in the short run as the young feeder livestock that would normally enter

feedlots and then the slaughter market are diverted to the breeding herds. In addition, fewer older and less efficient livestock are culled from the breeding herd, thereby further reducing supply.

Livestock cycles, largely induced by economic and biological phenomena, are another important factor in analyzing supply response. Although shortrun response tends to be erratic, the longer run response produces a remarkably stable cyclical pattern. The cattle inventory cycle lasts about 8-10 years, while the hog cycle is about 4 years. The extended beef cycle reflects the longer biological time period required to expand production. Although it would appear that the cyclical effect could be modified, it is largely a function of misinterpretation by livestock decisionmakers of the economic signals, their intensity, and factors external to the industry (incomes, grain supplies, world economic situation, and weather) forcing adjustments. Livestock cycles break and turn down to a large extent because of the increased breeding herd buildup in the expansion phase of the cycle. Increasing demand and prices raise producer confidence and profits; then a sharper expansion begins. As the breeding herds start to build, fewer animals are available for consumption, thereby further increasing prices due to the inelastic demand. Producers misinterpret the intensity of the signal, and even more breeding stock is saved. Typically, the industry overexpands, forcing a correction period of reduced inventories. As production from the expanded breeding herd comes to market, prices begin to drop, signaling a slowdown in expansion. Reduced profits signify the end of the expansion phase and producers begin culling breeding stock, already held too long for market. Meat supplies continue to increase, due to the larger production base and culling rate. Feeding profits drop and many animals which would normally enter feedlots or the breeding herd are slaughtered, further expanding meat supplies. Severity of this adjustment depends on livestock numbers and demand strength via income levels and employment rates.

In the following section these attributes of the livestock sector are examined in concert with the events of the seventies and increased uncertainty in the beef industry.

THE SEVENTIES—INCREASING TURBULENCE FOR THE LIVESTOCK SECTOR

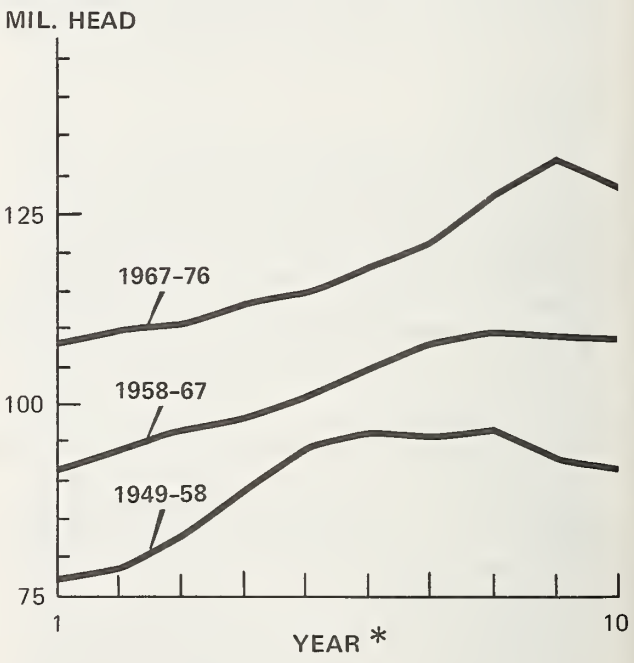
GENERAL SITUATION

As beef production shifted from general grain-livestock farm operations to large specialized feedlots, of 30,000- to over 100,000-head capacity, a stable and moderately priced grain supply became increasingly a necessity. Until the seventies, weather and its effect on grain production was the primary factor governing the supplies of grain available for feeding. Increasing supplies of feeder cattle and grain inputs, together with a growing demand, provided the incentives for the growth of these specialized "feeding factories." However, the big increase in foreign demand for grain and the need to improve our foreign exchange balance greatly increased the economic uncertainty (*3*).[1]

The beef industry experienced slow but positive growth from the low point in the last cycle in 1967 (fig. 1 and table 2). By 1970 the industry was largely divided into two specialized sectors—the producers of feeder cattle and the commercial feeders. Demand for U.S. feed grains was strong due to the expanding livestock sector and a more affluent world economy. Grain production was relatively plentiful and reserve supplies of grain were still burdensome.

The economy was expanding, incomes were rising and inflation was not yet a real threat. Cattle feeding was expanding both in terms of number and size of feedlots.

FIGURE 1
CATTLE ON FARMS BY CYCLE



* *YEARS OF CYCLE BEGINNING FROM LOW IN NUMBERS ON FARMS AND RANCHES.*

[1]Italicized numbers in parentheses refer to items in References at the end of this article.

Table 2.—Jan. 1 cattle inventory and calf crop, 1950-76

Year	Cattle	Cows	Cows/ cattle	Calf crops	Calf crop/ cows
	1,000 head	*1,000 head*	*Percent*	*1,000 head*	*Percent*
1950	77,963	37,946	49	34,899	92
1951	82,083	39,415	48	35,825	91
1952	88,072	41,225	47	38,273	93
1953	94,241	44,030	47	41,261	94
1954	95,679	46,045	48	42,601	93
1955	96,592	46,240	48	42,112	91
1956	95,900	45,460	47	41,376	91
1957	92,860	44,115	48	39,905	90
1958	91,176	42,790	47	38,860	91
1959	93,322	42,680	46	38,938	91
1960	96,236	43,325	45	39,416	91
1961	97,700	44,045	45	40,180	91
1962	100,369	45,086	45	41,441	92
1963	104,488	46,399	44	42,268	91
1964	107,903	47,868	44	43,809	92
1965	109,000	48,780	45	43,922	90
1966	108,862	47,990	44	43,537	91
1967	108,783	47,495	44	43,803	92
1968	109,371	47,685	44	44,315	93
1969	110,015	48,040	44	45,177	94
1970	112,369	48,780	43	45,871	94
1971	114,578	49,786	43	46,739	94
1972	117,862	50,585	43	47,695	94
1973	121,534	52,542	43	49,132	94
1974	127,670	54,293	43	50,695	93
1975	131,826	56,683	43	50,426	89
1976	127,976	54,834	43	46,905	86

Positive feeding margins, ample grain supplies, and a growing demand for beef made an expanded fed beef industry attractive to livestock producers, and outside investors provided much additional capital for the rapid expansion. To meet the expanding demand for feeder cattle, the beef herd was expanded rapidly. Feeder cattle prices had trended upward from the low point of the last beef cycle and weather conditions were favorable for expanded carrying capacity necessary for the growing beef herd. Ranchers were optimistic and were beginning to keep cows in the herds longer and retaining more replacement heifers. While this expansion would provide greater beef supplies in the future, its shortrun effect was to reduce current supplies, forcing higher meat prices.

CORN BLIGHT

Nature introduced the first of the numerous shocks into the beef industry in the seventies. The 1970/71 corn crop was reduced 11 percent below 1969 levels due to the corn blight (table 3). Despite substantial grain reserves, corn prices received by farmers rose 15 percent. Beef-feed price ratios started dropping as soon as the grain shortfall became apparent and grain prices started to rise (tables 1 and 4). Consequently the fourth quarter of 1970 and first quarter of 1971 produced losses for cattle feeders (table 5).

EXPANDED GRAIN SUPPLIES

The 1971/72 grain crop set a new production record of 207.7 million tons due to a sharply reduced set-aside requirement, favorable weather, and absence of corn blight. As the large harvest became obvious in mid-1971, grain prices began to fall, restoring attractive feeding margins and confidence to the livestock sector. Corn declined from $1.33 to $1.08 per bushel on the seasonal average and large grain reserves were again of concern. This led to increased set-aside acreage requirements for the 1972/73 crop (table 1).

In late 1971 meat prices started increasing due to rising consumer incomes and the reduced beef supplies that resulted from the 1970 corn blight and the diversion of heifers from slaughter to the breeding herds. Increased beef prices, low feed grain prices, and an attractive feeding margin again set the stage for increased herd expansion.

INCREASED GRAIN EXPORTS

The 1972/73 corn crop was large (yields were a record), and would have been even larger if set-aside acreages had not been increased. However, rather than declining, feed grain prices began increasing due to an expanding export demand. Poor weather in many parts of the world had caused a sharp decline in world grain production. Large sales were made from the Government grain stocks. In 1972/73 feed grain exports increased sharply from 27.1 to 43.1 million tons (table 1). Russia's grain production had been trending downward for several years and major purchases were needed to continue its expanding livestock production. However, in 1972 the USSR suffered a poor crop while still attempting to increase livestock production. The United States agreed to a major credit accord which provided financing for large Russian grain purchases.

POLICY SHIFT

A transition period in U.S. grain policy was beginning to take shape. Although domestic grain supplies seemed adequate, world grain reserves were becoming extremely low. The United States was experiencing rising inflation and a mounting balance-of-trade deficit. In an attempt to correct growing balance-of-payment problems, the dollar underwent two devaluations, making U.S. grains an even better buy on the world market.

As feed prices increased due to increased exports, feeding margins narrowed in mid-1972, but expanded feeding programs were still attractive and cattle numbers continued to increase. By late 1972 beef cattle prices began to rise and continued to do so until the spring of 1973. The severe winter of 1972-73 in the Plains and North Central cattle feeding areas led to increased death losses; feeding efficiency and rates of gain declined. Rising consumer incomes and a lower supply of beef caused prices to rise sharply. Price ceilings, under the Economic Stabilization

Table 3.—Corn: Marketing year supply, disappearance, acreage and prices, 1969-76
(adjusted for July 1 to June 1 shift in grain stocks reporting)

Year beginning Oct. 1	Supply				Disappearance					Ending stocks Sept. 30		
	Beginning stocks	Production	Imports	Total	Domestic use: Feed	Domestic use: Food, industry and seed	Domestic use: Total	Exports	Total disappearance	Privately held	Government[1]	Total
	Million bushels											
1969/70	1,118	4,687	1	5,806	3,795	394	4,189	612	4,801	462	543	1,005
1970/71	1,005	4,152	4	5,161	3,581	396	3,977	517	4,494	337	330	667
1971/72	667	5,641	1	6,309	3,997	390	4,387	796	5,183	408	718	1,126
1972/73	1,126	5,573	1	6,700	4,304	429	4,733	1,258	5,991	537	172	709
1973/74	709	5,647	1	6,357	4,183	448	4,631	1,243	5,874	475	8	483
1974/75	483	4,664	2	5,149	3,191	450	3,641	1,149	4,790	359	0	359
1975/76[2]	359	5,767	2	6,128	3,564	465	4,029	1,700	5,729	399	0	399
1976/77[3]	399	5,865	1	6,265	3,750 (+,-150)	485	4,235 (+,-150)	1,600 (+,-100)	5,835 (+,-100)	430	0	430 (+,-100)

	Acreage				Yield	Seasonal prices				Government price support operations		
	Base or allotment	Set-aside	Planted	Harvested for grain	Per harvested acre	Received by farmers	Chicago No. 2 yellow	Omaha No. 2 yellow	Gulf ports No. 2 yellow	National average loan rate	Support payment[5]	Total payments to participants
	Million acres				*Bushels*	*Dollars per bushel*						*Million Dollars*
1969/70	90.3	27.2	64.3	54.6	85.9	1.16	1.31	1.24	1.42	1.05	.13	
1970/71	90.3	26.1	66.8	57.4	72.4	1.33	1.47	1.39	1.56	1.05	.14	
1971/72	90.2	14.1	74.1	64.0	88.1	1.08	1.23	1.23	1.34	1.05	.16	893
1972/73	88.1	14.4	67.0	57.4	97.1	1.57	1.91	1.80	2.17	1.05	0	1,469
1973/74	88.7	6.0	71.9	91.2	2.55	2.95	2.79	3.11	1.05	0	910	
1974/75	([6])	0	77.8	65.4	71.4	3.03	3.12	3.05	3.26	1.10	0	[8]244
1975/76	([6])	0	77.9	66.9	86.2	2.55	[7]2.75	[7]2.66	[7]2.91	1.10	0	[8]90
1976/77	([6])	0	84.1	71.0	82.7	[6]2.33	[6]2.50	[6]2.36	[6]2.74	1.50		

[1] Under loan to or owned by CCC; includes CCC's uncommitted inventory in 1971 and 1972; total inventory in 1973 to date. [2] Preliminary. [3] Estimate. [4] Excludes support payment. [5] Average earned on total corn produced. [6] Available for total feed grains only. [7] October, 1976. [8] Disaster payments.

Table 4.—Beef steer-corn price ratio, Omaha basis, by months, 1970 to date[1]

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1970	23.7	24.4	26.0	25.2	23.9	24.1	24.3	22.1	20.9	21.3	20.3	18.8	22.8
1971	19.9	22.0	22.2	22.7	22.9	21.9	23.0	26.7	28.3	28.3	29.0	27.7	24.2
1972	28.5	29.5	28.6	27.6	23.1	30.8	31.0	29.5	27.1	27.3	25.1	24.7	28.0
1973	27.1	28.1	30.6	29.8	24.9	20.8	20.5	19.5	19.0	17.9	16.7	15.8	21.6
1974	17.4	15.7	15.5	16.7	16.1	14.2	13.7	13.1	12.0	10.9	10.9	11.1	13.7
1975	11.8	12.5	13.1	15.0	17.6	18.2	17.2	15.0	16.6	17.4	17.7	17.6	15.8
1976	16.0	14.9	13.8	16.6	14.8	14.2	13.4	13.8	14.3	16.0			

[1] Bushels of No. 2 yellow corn equivalent in value to 100 pounds of Choice slaughter steers 900-1,100 pounds, Omaha.

Program, were imposed on certain meat prices in March 1973 due to growing consumer complaints. In April a consumer boycott of meat purchases was initiated, cattle feeders responded by reducing marketings, and beef cattle prices continued to rise.

Set-aside requirements were eased for the 1973/74 crop but world grain demand was still strong. After going through a winter of inefficient, expensive gains for beef cattle, the livestock sector was being caught in a cost-price squeeze by early summer of 1973 due to rising grain prices. However, beef prices remained strong and breeding herds continued to increase. Feeder cattle prices were being bid competitively higher despite the retail price ceilings (table 6).

Table 5.—Cattle feeding: Estimated cash receipts, cost of goods sold, and net income, 23 States

Year and quarter	Cattle marketed, 23 States	Gross receipts[1]	Operating costs of goods[2]				Costs of fixed investments[3]	Net income	Accumulative net income[4]
			Calves	Feeding expenses	Interest charges	Total operating			
	Thousand head		*Million dollars*						
1970									
1st	6,148	1,908	1,027	658	42	1,727	16	165	165
2nd	6,219	1,975	1,043	684	43	1,770	16	189	354
3rd	6,302	1,994	1,110	732	48	1,890	16	88	442
4th	6,215	1,795	1,155	797	53	2,005	15	-227	215
1971									
1st	6,231	2,032	1,138	829	53	2,020	15,	-3	212
2nd	6,278	2,145	1,049	861	52	1,962	15.	168	380
3rd	6,594	2,265	1,138	959	52	2,149	15	101	481
4th	6,178	2,158	1,106	760	42	1,908	15	235	716
1972									
1st	6,443	1,438	1,161	743	41	1,945	15	478	1,191
2nd	6,727	1,546	1,271	708	43	2,022	15	509	1,703
3rd	6,907	2,630	1,375	778	47	2,200	15	415	2,118
4th	6,775	2,498	1,442	807	51	2,300	15	183	2,301
1973									
1st	6,585	2,992	1,452	849	51	2,352	15	625	2,926
2nd	6,283	3,024	1,424	804	50	2,278	15	731	3,657
3rd	5,958	3,039	1,557	1,004	59	2,620	15	404	4,061
4th	6,478	2,753	1,838	1,201	73	3,112	15	-374	3,687
1974									
1st	5,999	2,864	1,833	1,568	81	3,482	14	-632	3,055
2nd	6,271	2,634	1,616	1,567	70	3,253	14	-633	2,422
3rd	5,522	2,545	1,378	1,516	64	2,958	13	-426	1,996
4th	5,538	2,221	1,150	1,655	60	2,865	14	-442	1,554
1975									
1st	5,512	2,067	902	1,914	58	2,074	13	-820	734
2nd	5,028	2,536	649	1,567	45	2,261	13	262	996
3rd	5,014	2,561	618	1,448	43	2,109	13	439	1,435
4th	4,940	2,389	770	1,416	49	2,235	13	141	1,576
1976									
1st	6,350	2,574	966	1,757	52	2,775	12	-213	1,363
2nd	6,282	2,968	1,047	1,573	55	2,675	12	281	1,644

[1] Fat cattle are assumed marketed at 1,050 lb. Prices for fat cattle are based on quarterly average for choice 900-1,100 lb. steers at Omaha. [2] Costs based on prices paid for feeder steers two quarters prior to quarter marketed and feed prices during fattening period. Feeder calves are bought at 450 lb. and prices are based on quarterly averages for 400-500 lb. Choice steers in Kansas City. Cattle are assumed to gain 644 lb. (600 lb. net gain plus 44 lb. shrink—4%). Number of head purchased assumed to be two percent more than number sold to allow for death loss. Interest charges based on debt fund's outstanding items at Production Credit Association average interest rates. [3] Includes interest expenses on long term investment times debt and depreciation on long term fixed capital. [4] At end of quarter. [5] Forecast.

Packers and retailers reduced operating volumes because of the ceiling prices, the reduced marketings, and the sharply increasing live cattle prices. Ceilings were to be lifted in mid-August and feeders withheld cattle from market under the assumption that cattle prices would rise further once ceilings were lifted. On July 18, ceilings were lifted on all commodities except beef which were rescheduled for removal in mid-September. Beef cattle prices were then at or near record levels (table 6).

Liquidation Begins

Cattle-on-feed inventories were large and many cattle were now excessively finished at a high cost of gain, having been held longer awaiting removal of price ceilings. When the ceilings were finally lifted on September 10, 1973, the number and weights of cattle coming on the market were excessive and prices plummeted, particularly for the excessively finished cattle. The inelastic demand which had produced record prices because of shortages was now forcing prices down to move the large marketings into consumption channels. Choice steer prices at Omaha dropped from $48.57 per 100 pounds in the third quarter to $40.47 in the fourth quarter (table 6). Losses during the fourth quarter of 1973 were up sharply, amounting to well in excess of $100 per head.

This marked the beginning of the liquidation phase of the beef cycle which had reached its previous bottom in 1967. Cattle numbers were at record levels. A large breed-

Table 6.—Beef supplies and prices, 1971 to date

Year and quarter	Commercial cattle slaughter[1]						Average dressed weight	Commercial production	Per capita consumption[2]	Prices			
	Steers and heifers			Cows	Bulls and stags	Total				Retail	Choice Feeders 600-700 lb. Kansas City	Choice Steers Omaha 900-1,100 lb.	Farm
	Fed	Nonfed	Total										
	1,000 head						*Lb.*	*Mil. lb.*	*Lb.*	*Cent/ lb.*	*$/cwt.*	*$/cwt.*	*$/cwt.*
1971: I	6,380	572	6,952	1,500	135	8,587	619	5,300	27.7	100.2	33.57	31.06	27.93
II	6,480	687	7,167	1,586	164	8,917	612	5,445	28.1	104.8	34.50	32.54	29.17
III	6,820	666	7,486	1,614	179	9,279	602	5,574	29.3	105.4	34.84	32.71	29.00
IV	6,380	592	6,972	1,675	155	8,802	613	5,378	27.9	106.6	36.57	33.27	29.83
Year	26,060	2,517	28,577	6,375	633	35,585	611	21,697	113.0	104.2	34.87	32.39	29.00
1972: I	6,630	402	7,032	1,518	148	8,698	619	5,370	28.2	114.4	38.47	35.71	32.40
II	6,930	452	7,382	1,474	166	9,022	619	5,566	28.9	112.3	40.30	36.04	33.33
III	7,140	223	7,363	1,472	180	9,015	618	5,559	29.4	115.3	42.46	36.26	34.07
IV	6,970	395	7,365	1,528	151	9,044	635	5,723	29.6	113.2	44.36	35.12	34.07
Year	27,670	1,472	5,992	645	35,779	623	22,218	116.1	113.8	41.40	35.78	33.50	
1973: I	6,770	146	6,916	1,590	156	8,662	624	5,393	28.0	129.2	50.77	43.28	40.80
II	6,470	86	6,556	1,434	165	8,155	621	5,049	26.2	135.8	53.74	45.84	43.43
III	6,080	204	6,284	1,533	180	7,997	625	4,998	26.8	141.8	57.98	48.57	47.67
IV	6,570	437	7,007	1,691	175	8,873	638	5,648	28.6	135.1	50.20	40.47	40.00
Year	25,890	873	26,763	6,248	676	33,687	626	21,088	109.6	135.5	53.17	44.54	42.80
1974: I	6,100	560	6,660	1,689	165	8,514	638	5,434	28.3	145.1	47.78	45.46	42.83
II	6,480	817	7,247	1,391	179	8,817	639	5,638	28.8	134.5	39.80	40.01	36.37
III	5,680	1,526	7,206	1,913	244	9,363	614	5,751	29.4	141.0	34.64	43.91	34.97
IV	5,670	1,695	2,521	232	10,118	595	6,021	30.3	134.5	29.31	38.19	28.83	
Year	23,880	4,598	28,478	7,514	820	36,812	621	22,844	116.8	138.8	37.88	41.89	35.60
1975: I	5,690	1,611	7,301	2,224	208	9,733	600	5,842	30.3	129.6	27.39	35.72	27.33
II	5,200	1,658	6,858	2,419	273	9,550	586	5,593	28.4	146.5	34.67	48.03	34.57
III	5,190	1,913	7,103	3,124	312	10,539	564	5,942	30.2	156.4	35.54	48.64	33.83
IV	5,120	1,875	6,995	3,790	304	11,089	568	6,296	31.2	151.4	38.06	46.05	33.07
Year	21,200	7,057	28,257	11,557	1,097	40,911	579	23,673	120.1	146.0	33.91	44.61	32.30
1976: I	6,560	1,367	7,927	2,749	236	10,912	595	6,491	32.7	142.1	39.19	38.71	33.77
II	6,150	1,431	7,581	2,329	258	10,168	604	6,144	31.1	141.5	43.89	41.42	37.03
III	6,400	1,600	8,000	2,600	270	10,870	605	6,580	32.9	136.5	38.10	37.30	32.90
IV													
Year													

[1] Classes estimated. [2] Total including farm production estimated for 1976.

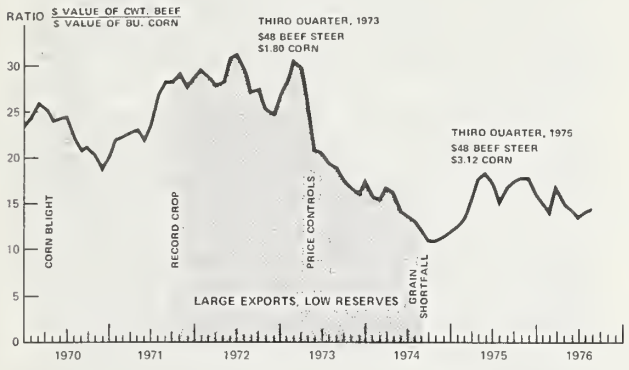
ing herd had been built in 1972/73. This herd was now coming into full production and cattle numbers were still rising. Grain supplies in 1973/74 were just adequate and reserves continued to be drawn down. However, the strong export demand continued and the need to improve the trade balance was accentuated by the rapidly increasing petroleum prices. Set-aside acreage requirements were discontinued with the aim of full grain production in 1974. Due to late plantings in some areas, drought in others, and an early frost, the 1974/75 crop was short. Increased grain prices dropped livestock margins once again, this time with cattle numbers at record levels, and herd liquidation was accelerated.

The 1974 grain shortfall, continued large exports, and high grain prices caused the liquidation phase of the beef cycle to begin in earnest. Numbers of cattle on feed, which had reached an all-time high of 13.9 million on January 1, 1973, plummeted to 8.5 million by April 1, 1975. In late 1973, 1974, and into early 1975, cattle feeders experienced negative margins (table 5). Losses were so great that the Emergency Livestock Credit Act was passed in 1974 providing Government guarantees on loans made to livestock enterprises. The loans helped, but the major problems of a cooling economy, reduced consumer demand, high grain prices, and excessive numbers were still present.

Monitoring of grain exports began after the 1974 crop shortfall. This, plus all available land once again being in production, a cooling world economy, and an early 1975 planting season, began to weaken grain prices. Despite large nonfed cattle marketings, low feedlot placements in 1974 and early 1975 and lower grain prices led to increased feeding margins during the summer of 1975. Although third quarter Omaha Choice steer prices once again reached $48 in 1975, as they had in 1973, sharply higher grain prices now cut the feeding margin nearly in

half (fig. 2). However, margins still favored placing cattle on feed. Feeders once again reacted to the improving margins and placed more cattle on feed.

FIGURE 2
BEEF STEER-CORN PRICE RATIO AND CHRONOLOGY



The 1975 corn crop was a record, but the Soviets were again experiencing drought and sharply increased their purchases of U.S. grain. Grain export sales were temporarily halted in the summer of 1975 until the record U.S. crop was assured, causing grain prices to drop. However, the embargo was only temporary; after sales were resumed, prices rose higher than they would have been otherwise.

Following the export monitoring, a stabilizing element was added to the grain policy in the fall of 1975. A U.S.-USSR agreement for annual sales of 6 million metric tons of wheat and corn for 5 years was negotiated. Purchases beyond this level would require mutual consent, and if U.S. production levels fell below 225 million metric tons, sales could be reduced.

While liquidation of the beef herd began in 1974, it was not until Janary 1976 that the large inventory finally began to decline. Low feedlot placements in early 1975 and improving feeding ratios had produced higher fed cattle prices by midyear. However, once again feeders failed to gauge the rate of recovery and size of the nonfed cattle slaughter during the liquidation. Large nonfed cattle slaughter and increased fed cattle marketings forced the feeding margins down again during the winter of 1975/76 (tables 5 and 6). During the summer of 1976 cattle weights and slaughter numbers increased, forcing prices still lower. Third quarter beef production was record-large and prices continued to drop.

With sharply reduced cattle numbers, an improving domestic and world grain situation, and sustained economic recovery, the beef industry may have justification for renewed optimism. However, before production levels increase to any large extent, feeding margins must improve and a more certain supply of grain at stable prices must be established. This could lead to more stable supplies of livestock to satisfy increasing consumer demand for the desired quality and quantities of meat products.

CONSIDERATIONS FOR LIVESTOCK-GRAINS POLICY

Uncertainties of the early seventies within the agricultural sector provide many issues to consider in formulating agricultural policy. For the livestock-grains sector, two considerations are of primary importance: the need for greater stability for both producer and consumer, and the need to meet increasing export demand.

Prior to the seventies, U.S. grain policy provided supplies in excess of a steadily growing domestic demand linked to expanding livestock and poultry sectors. Prices were fairly stable and reserves were sufficient to fill the gap caused by unfavorable weather or increased world demand. However, in the seventies under a rapidly expanding livestock sector (primarily beef and poultry) and an expanding world demand for grain, U.S. grain policy began to shift.

Stability in the livestock production sector may be improved if world grain production and U.S. grain reserves return to more traditional relationships. A closer view of the world and domestic situation and emerging domestic scenarios is necessary to set the stage for policy considerations.

WORLD SITUATION

Recent reports by the Foreign Demand and Competition Division of ERS analyze several alternative world grain-oilseed-livestock scenarios over the next decade (5). Their general conclusions indicate continued improvement in world economic activity, particularly in the developed countries, supporting a strong and growing demand for meat and livestock products under all scenarios. However, changes in trade policies, particularly in Western Europe and Japan, could alter this conclusion. Increasing grain production is associated with increased livestock feeding and expanded meat production in both developed and developing countries. Overall, the stage seems to be set for a growing livestock sector based primarily on increasing incomes, and a slowly expanding grain supply with decreasing prices. A closer view of the growing interdependence of domestic and foreign agricultural economies is presented in the Hanrahan and Kennedy article in this *Review*.

DOMESTIC SITUATION

Domestic livestock remain the primary source of demand for U.S. feed grains. U.S. feed grain production in 1976/77 is expected to reach near record proportions of 201.7 million tons with a carryover of 18.2 million tons at the end of the crop year (table 1). In addition, wheat feeding is expected to be the largest in several years as supplies increase. Greater stability should return to the livestock sector with grain reserves rising, grain prices

moderating, and world production returning to normal.

Recent inventory reductions in the cattle industry have been extremely sharp. The 1976 calf crop is estimated to be the smallest since 1971. With cow herds still being reduced, supplies of beef will be smaller over the next few years. Reduced beef supplies, a strengthening economy, and larger grain supplies improve the prospects for the beef sector. Although cattle numbers are nearing the low point of their cycle, hog numbers are nearing a cyclical peak, increasing production and dropping prices. Increased pork production, high beef production, and increased poultry supplies will have depressing effects on meat prices in general, although beef prices should head upward soon. However, even if a more acceptable income level is attained in 1977 by livestock producers, it will take several years before the beef supply can be expanded, due to biological restraints. In fact, if livestock feeding margins improve soon, the grain sector may well find its perennial demand source much lower at a time of increasing grain supplies.

Alternative Scenarios

A closer examination of alternative scenarios is helpful in looking forward to an expanded policy for the grain-livestock sector. The Davison and Ericksen article in this *Review* presents several different scenarios of the U.S. agricultural economy. The interdependence of the livestock and feed grain sectors can be examined given the present livestock and feed grain base under alternative feed grain supply situations.

In the middle of the three scenarios, the feed grain-livestock relationships return to a typical historical relationship. Feed grain yields continue to increase gradually and ending stocks in 1976 reach and remain near the 30 million tons regarded as a reasonable level. Feed grain prices decline fairly quickly until 1978 when corn stabilizes at about $1.90 per bushel.

The cattle sector responds. Beef production begins to expand in 1979 but does not exceed 1976 levels until 1980. The pork sector appears less responsive because of the production cycle peaking in 1978 and the high 1975/76 price levels at the low point in the cycle.

The alternative high and low feed grain supply scenarios reflect the interactions of the livestock sectors to these two extreme feed grain supplies available to the livestock sector. Under the scenario reflecting expanded domestic feed grain supplies, ending stocks and production return to burdensome levels, with grain prices dropping more severely. The beef industry's response is greater under this scenario. The expansion phase shows up in 1978, with a slight dip in beef production under the middle feed grain supply scenario due to heifers being shifted to breeding herds. However, heavier feeding weights and expanding numbers from the 1977 low are reflected in expanding production in 1979. The pork sector's adjustments are less severe, with a slight drop in production occurring in 1980. Larger supplies are reflected in the lower price ranges; however, the low feed grain prices provide incentives for expanded livestock production due to expanding consumer demand.

Livestock production under the low feed grain supply scenario reflects the reaction to higher feed grain prices In this scenario, livestock production, particularly pork, runs below the other scenarios. Reduced grain supplies are reflected in higher meat prices. However, with increased uncertainty and lower profit levels due to high grain prices, expansion of the livestock sector is much more moderate.

Market instability due to weather uncertainties, insects, disease, and cyclical inventory adjustments will continue. However, an expanded world export market sharply increases the variability in export demand and related domestic prices. This volatility in grain prices makes formulation of longrun plans extremely difficult for the livestock sector. Producers find themselves in a position in which they have little protection against sudden falls in prices of their livestock and sharply increasing grain prices, particularly during periods of large livestock inventories.

Shortrun results are easily observed. Livestock supplies are large and cattle prices are relatively low. However, in the longer run, under present uncertainties, producers may well elect to restrict expansion to avoid the large losses which have resulted in the past few years. Uncertain income flows to livestock producers make longrun investment planning extremely difficult. Many specialized cattle feedlots built in the seventies are having great difficulty meeting debt obligations. The end result for consumers, given the inelastic demand for meat products and rising incomes, could well be higher prices and a restricted meat supply. Price uncertainty therefore will render production less efficient because of an inefficient allocation of resources caused by erratic grain supplies and prices.

Policy Considerations

If a normal and increasing supply of livestock products of the desired quality is to meet a growing demand, the livestock sector and consumer interests must be included as an integral part of U.S. grain policy. The uncertainties of the early seventies provide examples of all too many issues that need consideration—those involved with providing greater stability to the grains-livestock sectors and consequently consumers, and those to meet the expanding grain export demand.

Authors of several articles (*1*, *2*, *4*, *6*) have recently suggested the need for more explicit consideration of the livestock industry in grain policy formulation. In discussing an expanded feed grains policy and the effects on the livestock and poultry sectors, three interrelated points are important:

1. Many livestock and poultry enterprises are now large, highly concentrated operations. They operate on profit margins defined by the differences in input and product prices. Consequently, a more

stable supply of grains could help reduce the volatility in margins recently experienced.

2. Consumers have been faced with fluctuating meat and poultry prices due to production variability. In addition, the mix of meat products available can be affected, as in the case of the unusual fed-nonfed beef ratios or the extremely short pork supplies of the past couple of years.

Points 1 and 2 are inextricably woven together, and are largely the result of instability in the livestock-grain sector. Uncertain grain supplies and prices affect the willingness and ability of feeders to obtain operating and investment capital through capital accumulation or commercial sources. The end results for the consumer have been irregular flows of meat at volatile prices.

3. Grain exports are an expanding and increasingly important competitor for the domestic grain supply. However, an expanded grain export program and improved trade balance may be an economic necessity. A change in policy on grain exports, particularly at the margin, will undoubtedly increase uncertainty in the decisionmaking process. Although the livestock and poultry sectors will continue to be the largest consumers of the domestic grain supply, the export market will continue to determine the price at the margin. When this marginal grain demand is reduced or absent, the price decrease will also be sharp. If foreign grain demand drops while livestock inventories are at depressed levels, the reduced income effects on grain farmers may be analogous to the past periods of large surpluses.

Whether grain export policy follows the dictates of the recent U.S.-Russian grains agreement to stabilize U.S. domestic supplies while striving for full production and a position as a reliable trading partner in the world grains market, or returns to a (limited) grain reserves program, a greater degree of stability is needed. Despite the policy alternative selected, livestock producers must be provided greater certainty in input prices and therefore efficient use of resources if a more stable and increased level of production is desired. Extreme shocks should be avoided; the interdependence in long-term goals of livestock producers and consumers, and the desire for a more stable meat supply should be considered. Several grain stabilization alternatives are discussed in this *Review*. The article by Sharples and Walker, for example, discusses the issue of grain stocks management. Also, the article by Penn and Brown discusses price stabilization through the use of target price and loan rate concepts.

Feed grain policy needs to be shaped so that it is able to adjust as uncertainties in domestic and foreign demand arise. Flexibility is needed to adjust for shortrun grain surpluses or shortages while allowing a reasonably stable domestic food policy along the longrun demand curve in order to avoid extreme price swings.

Complete stability cannot be expected for the livestock sector because of shifts in weather and cyclical uncertainties. Stability in domestic food policy cannot be attained without including the livestock sector in grain policy decisions.

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INTERNATIONAL CONSIDERATIONS IN THE DEVELOPMENT OF DOMESTIC AGRICULTURAL AND FOOD POLICY

By
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ABSTRACT

U.S. agricultural and food policy functions increasingly in an international environment. This growing world interdependence introduces new problems as well as opportunities. In this article the authors discuss U.S. commercial agricultural trade with developed, centrally planned, and developing countries. Food aid and agricultural development assistance are also considered, as is the problem of price instability of internationally traded agricultural commodities.

Keywords: International price instability, agricultural and food policy, agricultural trade.

INTRODUCTION

Since 1972, U.S. agricultural and food policy has been operating in a substantially different environment from that in the two preceding decades. The main events responsible have been discussed elsewhere(*I*, *II*)[1] and require only a brief summary here. They include a decline in world food production in 1972 and a policy decision by the Soviet Union to import huge amounts of grain. These and other events brought about a decline in world food stocks and rapid increases in prices of grains and other basic food commodities. The elimination of surplus stocks resulted in a decrease in the quantity of U.S. food aid. World food production recovered to above trend in 1973 and increased further in 1975. Prices of U.S. farm products, down substantially from highs reached in 1974, would have declined more had it not been for the additional and unexpected Soviet purchases. Today, grain stocks remain low, in part because the Soviet Union again came into the international market in 1975 to offset its crop shortfalls. Price and supply instability continues to be a threat in view of the low level of world stocks.

These events demonstrate the growing interdependence among countries in the production, consumption, and trade of food. The U.S. economy has become more dependent on other countries as commercial markets for its food and agricultural output, and other countries have become increasingly dependent upon the United States as a source of supply for food and agricultural products.

The changed environment has created concern about the prospects of producing and distributing enough food to feed the world's growing population adequately. Particular concern has been expressed about the ability of the developing countries to meet their food requirements. The role of the United States in assisting the agricultural development of these countries in addition to its role as a supplier of food aid has become increasingly important.

Within this interdependent environment, important international considerations for U.S. agricultural and food policy are emerging. Especially significant are issues that relate to commercial agricultural trade, food aid, foreign agricultural development, and price and supply instability in international commodity markets.

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[1] Italicized numbers in parentheses refer to items in References at the end of the article.

COMMERCIAL AGRICULTURAL TRADE

The U.S. agricultural economy has become heavily dependent on other countries for markets for its food and agricultural output. As a result of strong foreign demand, exports of wheat, feed grains, and soybeans increased sharply in 1972/73, and, with the exception of 1974/75, agricultural exports have continued their strong upward trend. Currently the United States exports about one-third of its grain output, slightly more than one-half of total world trade in grains. These exports include over 60 percent of the U.S. wheat crop, 40 percent of the soybean crop, and about 25 percent of corn production.

Agricultural exports contribute substantially to farm incomes, are increasingly important in the U.S. balance of trade, and can strongly influence the level of domestic food prices. Increasing export demand has contributed substantially to the record farm income levels attained since 1972. The surplus in the agricultural trade account grew during the 1960's but never exceeded $2 billion, while between 1972 and 1975, it quadrupled to more than $12 billion. Consumers have become more involved in the public debate on agricultural trade and development issues because of rising food prices which can be attributed in part to increased export demand. Of course other factors such as inflation and the increased costs of farm inputs have also affected the level of product prices.

While the U.S. economy has come to rely more heavily on foreign agricultural trade, other countries have become increasingly dependent on the United States for food and agricultural products. Despite their concerted efforts to increase domestic self-sufficiency and control imports of food, the member countries of the European Community (EC) and Japan continue to be large and stable commercial buyers of U.S. agricultural commodities. With increasing frequency, the USSR, China, and other centrally planned economies enter U.S. markets to purchase food supplies. These large but sporadic purchases by centrally planned countries have become a major source of price instability in the world grain market.

Collectively, the developing countries (which accounted for 42 percent of U.S. commercial agricultural exports in 1975) constitute the largest commercial outlet for U.S. farm exports. These markets will grow in importance as foreign exchange earnings rise and economic development accelerates.

Trade With Developed Countries

The growing significance of agricultural trade to the U.S. economy serves to underline the importance of U.S. efforts to negotiate, in the Multilateral Trade Negotiations (MTN's), more liberalized access for its exports in the commercial markets of its traditional developed country customers. U.S. trade policy as reflected in positions taken in the MTN's also underlines the relationship between its domestic and foreign agricultural policies.

In the current round of MTN's, the main objective of the United States is to secure access for its exports through the harmonization, reduction, or elimination of agricultural trade distortions that impede the expansion of trade with its traditional developed country customers, particularly Western Europe and Japan. At the same time, the United States is seeking to strengthen rules under the General Agreement on Tariffs and Trade (GATT) that govern the use of export subsidies, safeguard procedures, and access to supplies. For the United States, the effort to secure freer access for its major export crops in these and other developed country markets is the international complement to domestic policies of full production and a market-oriented agriculture.

U.S. domestic policy in agriculture has sought to maximize farm income, assure stable consumer prices, and minimize Government involvement in and expenditure on the farm sector. The elaborate system of price supports, acreage controls, marketing quotas, and other devices designed to maintain farm income has not been operative for the major crops in recent years. Loan rates have been at levels below market clearing prices and, as a result, Government-held stocks are unlikely to build up rapidly. Under the Agriculture and Consumer Protection Act of 1973, target prices which trigger direct payments to farmers replaced price supports as the means of maintaining farm income for major export commodities.

Multilateral trade liberalization aimed at expanding trade flows is the international means for achieving the domestic policy goals mentioned above. Farm incomes can be kept high through trade expansion. Consumer prices can be stabilized through more more orderly international marketing of agricultural commodities. Channeling production in excess of domestic requirements into expanding export markets rather than accumulating stocks can also help keep Government agricultural expenditures to a minimum.

The United States has an impressive record of support for trade liberalization. A majority of tariffs authorized in the 1930's have been reduced 50 percent or more, and import quotas are in effect for only a few commodities: dairy products, cotton, peanuts, and sugar (a global quota). Quotas on meat were administratively suspended in 1973, but they were formally imposed for the first time recently under the meat import law. Export subsidies for wheat, feed grains, and other commodities have been terminated or suspended, although the legislative authority exists for their re-introduction under certain circumstances.

Despite considerable progress in moving toward a more liberal world agricultural trade, some trade regulations remain, and export controls were used recently when strong export demand pushed up U.S. consumer and producer prices. Publicly expressed views about the price effects of expanding exports by labor unions, livestock producers, and consumer groups led to the cancellation of soybean contracts with Japan in 1973 and 1974, and delayed (followed by partial cancellation) grain sales to the Soviet Union.

Export controls raise issues that are difficult to reconcile about the tradeoff between consumer interests in stable, low food prices and producer interests in low input costs and high farm prices. In addition, export controls create doubt among foreign customers about the reliability of the United States as a source of supply and about its commitment to liberalization of trade. Export controls can also contribute to the reduction of foreign market shares. The cancellation of U.S. soybean contracts in 1973 at least partially caused Japan's negotiating in 1974 a contract with Brazil for the production and purchase of soybeans. Official dissatisfaction with export controls also helped lead to the U.S.-USSR grain accord discussed in the next section.

In other countries, domestic agricultural policies are also closely related to foreign agricultural trade policies. The system of variable levies, minimum import prices, price supports, and export subsidies which comprises the Common Agricultural Policy (CAP) of the European Community affords European farmers considerable protection against competition from producers in the United States and elsewhere. The EC views the CAP as the major component of a tripartite domestic agricultural policy. The CAP also includes structural policies to facilitate the creation of larger farms and to enhance the mobility of agricultural labor; and social policies to create nonagricultural employment in rural communities, and to provide income and security to retired farmers.

Although the linkages between domestic agricultural policies and trade policies complicate efforts to achieve further liberalization of trade in agricultural commodities, they do not preclude negotiations on the reduction or elimination of border protection measures such as export subsidies or other trade restrictions. Furthermore, none of the major developed country participants in the MTN's has taken the position that domestic agricultural policies are proper subjects for trade negotiations.

Because their domestic policy goals differ, the EC and Japanese approaches to the MTN's diverge from those of the United States. In contrast to trade liberalization, the EC has proposed various administrative mechanisms, including intergovernmental commodity agreements (ICA's) as means to regulate expanded trade in agricultural commodities. The EC proposal for an ICA on grains that includes buffer stocks to support minimum and maximum prices and purchase and supply commitments illustrates its approach to trade expansion. The Japanese appear similarly concerned to negotiate approaches not unlike the administrative arrangements proposed by the EC that will assure them uninterrupted access to supplies at stable prices.

Compromise will be required if the United States and its developed country trading partners are to overcome the apparent impasse that now exists in the MTN's. To achieve its objective of expanded trade through liberalized access to foreign markets, the United States may be required to offer improved access to its own markets for certain commodities. With the removal of trade barriers, some commodity sectors may require assistance in minimizing difficult adjustment problems.

Such concessions may be necessary but not sufficient inducements to persuade the EC or Japan to rethink its position in support of greater management of commodity trade. In addition to negotiations on particular border protection measures, the MTN's provide a forum in which to discuss possible alternatives for regulating world agricultural trade that lie between more liberalized market-oriented reforms advocated by the United States and more administratively managed commodity markets advocated by the Europeans and the Japanese.

The direct linkages between domestic agricultural and foreign trade policies suggest that research is needed on the domestic goals and policies of foreign countries. Domestic policies will affect the extent to which foreign countries are prepared to rely on trade to provide them with some of their supplies of food and fiber. Not only are domestic agricultural policies important, but fiscal and monetary policies can also affect the extent to which countries are prepared to rely more on international markets and less on domestic self-sufficiency to meet food and fiber needs. Recent research on the impact of dollar devaluation on the demand for U.S. exports raises issues about the relationship between more general economic policies and agricultural trade (*8,12,3,13,4*).

Little is known about the consequences of reducing or eliminating trade barriers for a host of economic variables, including but not limited to resource use, employment, production, prices, and balance of payments. Moreover, the sectoral adjustments that might accompany trade liberalization are poorly understood. The policies, positions, and proposals advanced by other participants in the MTN's and in other international fora need to be examined for their impact on the economies of major trading nations.

Trade With Centrally Planned Countries

U.S. commercial trade relations with the USSR since 1972 demonstrate how significant external events can be for the formulation of domestic agricultural and food policies.

U.S. efforts to expand export markets were abetted primarily by the USSR's policy decision in the 1970's to meet the requirements of its growing livestock sector by importing huge quantities of grain—20 million tons in 1972-73, when import needs were accentuated by a poor crop. In the fifties and sixties, sales to Russia had been curtailed as part of the cold war policy of containment. During that period, the USSR was, on balance, a net exporter of grain. In the event of short supplies, its policy was to slaughter livestock or ration supplies rather than purchase imports. In 1974-75 and 1975-76, the Russians again entered the U.S. market to make sizable purchases of grain.

These large but irregular Soviet purchases have had a

profound, destabilizing impact on the U.S. and world grain economies. Output, prices, and income have been affected worldwide. The considerable rise in grain prices, generated in large measure by the Russian purchases in 1972, forced a severe adjustment in the U.S. livestock sector as grains were bid away from livestock production to the export market. The rise in grain prices along with other factors caused consumer prices for food products to increase to record levels.

The experience of trading with the USSR illustrates the extent of consumers' interest in, and influence on, U.S. agricultural-food policy, including commercial trade policy. Primarily, efforts of the labor unions, in their stated roles as consumer representatives, led to first the temporary halt of grain exports to the USSR in 1975 and later, the U.S.-USSR grain agreement. Livestock producers concerned with higher feed costs added to public pressure to limit exports; and the contraction of the livestock sector which contributed to higher consumer prices for beef and other livestock products reinforced consumer demands for export controls.

Market economies encounter very real difficulties when they trade with centrally planned economies. Inadequate information on the agricultural economies of these countries creates uncertainties in exporting countries about import requirements and intentions. This lack of information coupled with the procurement monopoly enjoyed by state trading agencies gives the centrally planned countries an advantage in dealing with private sellers in more market-oriented economies. The result can be an "asymmetrical distribution of the benefits of economic exchanges" (*13*).

Concern about the price destabilizing effects of unregulated grain sales to the Soviet Union, translated into political pressure applied by producer and consumer groups, culminated in the signing of the U.S.-USSR grain accord in 1976. This agreement removes much of the uncertainty from U.S. trade with the Soviets, but it does not completely remove the destabilizing influence of the Soviet Union in the world grain market. Though the grain that the USSR purchases from the United States can be limited to 8 million tons, it could still purchase additional grain in foreign markets, putting indirect pressure on U.S. grain supplies and prices.

Trade with the USSR and other centrally planned countries will continue to be an important preoccupation of U.S. agricultural-food policymakers. Because the centrally planned countries rely on state trading, it may be necessary to examine domestic marketing institutions and international trading arrangements other than those codified in the GATT to regulate trade more effectively with these countries. Research is needed to identify and assess such alternative marketing arrangements and their economic consequences. In addition, rules and regulations which differ from those codified in the GATT for integrating more effectively the USSR and other centrally planned countries into the world agricultural economy may need to be examined.

Trade With Developing Countries

U.S. agricultural and food policymakers need also to take into account the growing importance of commercial markets in the developing countries. Growth in their commercial demand for U.S. agricultural exports is not entirely a recent phenomenon. An ERS study of the experience of 66 developing countries from 1957 to 1964 showed that an increase in per capita income of 10 percent resulted in a 25-percent increase in agricultural imports (measured by value) in developing countries, 11 percent in medium-income countries, and 8 percent in developed countries (*4*). More recently, the rapid growth in 10 developing countries' markets has been documented by Parker (*8*).

Many developing countries are also actual or would-be exporters of a large number of agricultural commodities, including the tropical products but also products that compete with U.S. exports; such as wheat, rice, oilseeds, livestock products, cotton, and fruits and vegetables. These countries depend upon exports of primary commodities for foreign exchange to purchase capital goods and other imports essential for development as well as to service and repay debts. Their ability to export many of these commodities has been constrained by many of the domestic and trade policies of developed countries.

In response to developing countries' interests in increasing export earnings, the United States has offered more liberalized access for certain products by the reduction of tariff and non-tariff barriers to trade on a most-favored-nation or preferential basis. For example, the 1974 Trade Act provides for a generalized system of preferences (GSP) designed to accord the developing countries duty free access for many export commodities. Although intended primarily to open U.S. markets for developing country manufactures, some 300 agricultural products are included on the list of eligible commodities. The impact of the GSP on U.S. agriculture is as yet uncertain, and some U.S. commodity groups are seeking exclusions from the list. These may be granted to producers who establish that they will be adversely affected by duty-free access.

Many developing countries doubt that trade liberalization will generate enough foreign exchange to accelerate their economic development. They are dubious on both economic and political grounds. Instability in world markets for primary export commodities adds to fluctuations in foreign exchange earnings and increases the developing countries' anxiety about the risks they perceive in relying on more liberalized trade to accelerate their economic development. Further, trade policy changes by the developed market economies have not yet substantially enhanced access for developing countries' exports.

Politically, the developing world seeks a more radical reform of the international economic order than is implied by trade liberalization. These nations are concerned about their inability to influence the forces which govern world commodity markets under existing international arrangements. In the view of many developing

countries, liberalized access for products of export interest to them is but one element of a comprehensive program to create a new international economic order. To create this new order based on a redistribution of income from the rich to the poor world, the developing countries, led by the Group of 77, have proposed an Integrated Program for Commodities (IPC) designed to achieve their foreign exchange and development goals through the international management of commodity markets.

This integrated program, as presented at the Fourth United Nations Conference on Trade and Development (UNCTAD) session on commodity problems, contains seven major elements:

- Intergovermental Commodity Agreements (ICA's) for primary products of export interest to developing countries;
- A common fund to finance buffer stocks of key storable commodities;
- Intergovernmental purchase and supply agreements;
- Indexation of the prices of the developing countries' primary exports to the prices of imports;
- Compensatory financing when real export earnings decline;
- Improved access for products to developing country markets;
- Relocation of primary processing industries in the developing countries.

The United States has indicated a willingness to discuss commodity problems, and at Nairobi presented a four-point program of its own on international commodity problems. These four points stress the promotion of adequate public and private investment in developing countries, the improvement of trade conditions for individual commodities, the stabilization of export earnings of developing countries, and measures to encourage processing of primary products in those countries. The United States, however, opposed the general thrust of government intervention in commodity trade as implied by the Integrated Program for Commodities (IPC). Thus, the United States has agreed to participate in UNCTAD's individual commodity meetings, but has not made a prior commitment to take part in the negotiations. Likewise, with respect to the common fund, the United States is participating in the preparatory meetings, but has deferred the decision on participation in the March 1977 negotiating conference. The United States has also taken the position that individual commodity agreements should be considered on a case-by-case basis.

The willingness to discuss commodity problems with the Group of 77 suggests that the United States will be seeking to develop constructive alternatives to proposals made by the developing countries, and to discover areas of common interest. Effective U.S. participation in any future dialogue within UNCTAD will require research and information on the various components of the integrated program and alternatives to it. The main controversy exists over the means that developing countries wish to use to achieve their goals in foreign exchange, development, and income redistribution. How this controversy will be resolved has implications for the efficient allocation of the world's resources and for the equitable distribution of world income. The IPC also has potentially important implications for U.S. and world agriculture, as many of the key commodities for which agreements are proposed are competitive with U.S. agricultural products. Others include commodities which are significant imports by the U.S. economy. Consequently, U.S. agricultural-food policy cannot be indifferent to the potential consequences of greater management of trade in agricultural commodities.

Because of U.S. commercial interests in expanding markets and accelerating economic development in the developing countries, and because of the U.S. commitment to further trade liberalization, two kinds of information are required for the formulation of policy. First, knowledge is needed on: (a) how well or badly elements of the integrated program can meet the foreign exchange, development, and equity goals of the developing countries and (b) the potential impacts on producers, consumers and governments in both developed and developing countries of more highly regulated commodity markets. Second, information is necessary as to the economic consequences of alternatives to the integrated program, such as agreements on commodities of export interest to the developing countries and more liberal access to developed countries' markets for developing country agricultural exports.

FOOD AID AND AGRICULTURAL DEVELOPMENT ASSISTANCE

Interdependence also extends to the role of the United States and other developed countries in two areas:

- Providing food aid to many poorer developing countries whose foreign exchange earnings do not permit them to operate in commercial markets;
- Assisting the developing countries to increase their own food production through the transfer of technology and investment in agricultural and rural development.

Food aid has become an integral part of the U.S. foreign aid program. The United States also devotes an increasing portion of its bilateral foreign aid program to increasing agricultural production in the developing countries and it also makes contributions through international organizations such as the World Bank, the United Nations Development Program, the Food and Agriculture Organization (FAO), the World Food Program, and the regional development banks.

Such U.S. aid has been justified partly on the grounds that it helped poor countries supply critical domestic needs for agricultural commodities which they could not afford to import commercially, or that it promoted economic growth which generated an effective commercial demand for agricultural commodities. However, the recent controversy over competition to U.S. vegetable oils from palm oil imports from Asian and African countries illustrates that investment and technological change in the agriculture of developing countries may also affect comparative advantage and competition in world commodity markets. The longrun ability of developing country producers to develop and maintain such a competitive advantage is unknown but such controversies may arise more frequently as developing countries improve their agriculture and press for access to developed country markets. The potential benefits and costs from the accelerated transfer of technology and increased investment in developing country agriculture have barely been explored.

Food Aid

Growing commercial exports and the low level of stocks raise the opportunity costs of providing concessional supplies of food to poor countries. Nevertheless, the U.S. food aid program has become a permanent part of the Nation's foreign aid program. Legislative authority for the food aid program expires in 1977, but it is unlikely that food aid will be phased out. Some developing countries will continue to rely on it to meet emergencies, to supplement domestic supplies, or to support their economic development.

Conventional wisdom and some empirical evidence suggest that, in general, food aid for purposes other than to meet emergency requirements dampens farmers' incentives to produce and retards agricultural and economic development in recipient countries. But the volume of food aid has declined dramatically as the opportunity costs of providing it have increased. Further, recipient countries, in view of the tightness of supplies and high import prices, are more aware of the risks involved in relying on food aid as their major source of supplies and of the need to improve incentives for domestic production.

The U.S. commitment to providing humanitarian food aid when natural or other disasters threaten people with death, malnutrition, and starvation is not at issue. Grants of food to meet such emergencies will continue to be provided as needed. But issues involved in selling food on concessional terms to developing countries that cannot purchase supplies in commercial markets and in using food to promote economic development need to be considered. Higher opportunity costs for food and the linking of food aid to agricultural and rural development and population control also raise some important issues.

The benefits and costs to donors and recipients of food aid versus alternative forms of foreign assistance need to be weighed in deciding on the volume of food aid to be made available on concessional terms to poor countries. While it is true that food aid has presently ceased to be a surplus disposal program, certain commodity sectors continue to have a real interest in continuing such aid. Commercial export demand currently limits the quantities of wheat and feed grains available for concessional export, but substantial volumes of rice, cotton, and dairy products are still marketed through P.L. 480. Thus, the impact of alternative food aid levels on employment and income in affected U.S. commodity sectors is an important consideration. Further, in the absence of large stocks, commodities must now be purchased on the domestic market for resale through P.L. 480. Consequently, the effect of alternative levels of food aid on prices to U.S. consumers needs also to be considered.

Current legislation conditions the availability of food aid upon increased investment in agricultural and rural development and population control in recipient countries. The implications of this requirement need to be investigated in the context of specific developing countries. Additionally, food aid must be used in ways that minimize or eliminate the disincentive effects on food production in recipient countries. Systems need to be designed that distribute food aid within developing countries to meet the needs of the rural and urban poor and of vulnerable groups. Using food aid to provide employment in public works or to build emergency stocks, for example, may be appropriate in particular countries.

Agricultural Development Assistance

Projections of food supply and demand point to potentially large and growing deficits of food in the developing countries (*10,2*). While the present needs of food-deficit developing countries are being met by commercial and concessional imports, over the long run the burden of financing such large deficits through imports would be staggering and beyond the capacity of many developing countries. The longrun ability and willingness of the United States and other exporting countries to supply such large quantities of food on concessional terms is doubtful. Thus, the developing countries themselves will need to achieve substantially higher levels of food production to meet growing food requirements. Longrun efforts to increase food production per capita depend also on improving food distribution systems and slowing rapid rates of population growth.

Some controversy remains about the adequacy of natural resources to produce sufficient food to meet the needs of a growing world population. The neo-Malthusians continue to argue that limitations on resources to produce food cannot be overcome. The weight of the evidence, however, is that the world does have sufficient resources with which to produce food (*1, 5, 7*). However, the costs of developing new land and water resources for food production may be higher than in the past. Experience with high-yielding grain varieties in South Asia also demonstrates that improved technologies can be developed and applied in the developing countries.

What governments do in both developed and developing countries about their agricultural policies will largely determine the success of efforts to increase food production on a worldwide basis. Domestic agricultural and trade policies of developed countries affect the developing countries' ability to participate in commercial trade or to exploit comparative advantage in particular lines of production. Concessional trade policies also run the risk of interfering with developing countries' efforts to increase agricultural output, but these risks may be discounted to the extent that it is feasible to channel food aid into development programs.

Of equal or greater importance for expanding food production are the domestic agricultural policies of the developing countries themselves. Many of them follow policies that are adverse to increased agricultural production and improved distribution. Policies that favor industry over agriculture or that keep food prices low to urban consumers, for example, may increase input costs and depress producer prices. Monetary and fiscal policies can also influence the terms of trade between agriculture and the rest of the economy and discourage increased output. The net effect of all such policies is to dampen incentives for farmers to invest in technological innovations. Such policies also reduce the effective demand of producers for technological innovations that could be supplied by research institutions.

On the other hand, many countries pursue policies that stimulate agricultural development. The realization that agriculture should be given a higher priority in development plans has grown in recent years. Food imbalances in specific countries contribute to a growing awareness that food production should be increased. Heightened sensitivity to the risks involved in relying on either commercial or concessional trade to cover food deficits also contributes to a more positive attitude in many developing countries toward agricultural development.

It is within this international policy context that issues involved in providing agricultural development assistance emerge. Such assistance can have important effects on the interests of producers and consumers of farm products in the United States. Schuh has suggested that U.S. consumers have an economic interest in agricultural development abroad as increased food and agricultural output in the world can result in lower food prices (*9*). U.S. consumers stand to benefit if aggregate supplies of raw and processed agricultural products increase relative to demand and if restrictions do not impede trade in such commodities.

If agricultural development assistance results in accelerated economic development, that is, in increased employment and incomes in agriculture and related sectors, then U.S. producers also stand to benefit from an increased demand for products in which they have a comparative advantage. Conversely, investment and the transfer of technology to developing country agriculture will also affect the location of production and comparative advantage. Such assistance could lead to shifts or enhancement in comparative advantage, putting some U.S. producers at a competitive disadvantage vis-a-vis developing country producers.

The relationship between government policies in developing countries and efforts to assist in their agricultural development is an important determinant of the success of foreign aid efforts. Data and analyses are needed in at least five areas:

- Effects of input and product price policies on food production, consumption, and trade in particular developing countries which receive U.S. foreign agricultural assistance;
- Employment and income distribution impacts of productivity-increasing technologies made available by or with the assistance of the United States in bilateral or multilateral programs;
- Impact of monetary and fiscal policies on output, income, and employment in developing country agriculture;
- Role of domestic income growth and distribution in stimulating agricultural development;
- Interrelationships between agricultural development and general economic policy which substantially affect the extent to which developing countries will become commercial purchasers of U.S. agricultural exports.

Also important are the effects of technology transfer and investment in developing country agriculture on comparative advantage, location of production, and competition in world agricultural markets as a result of past and contemplated agricultural assistance. Closely related are the welfare effects of increased agricultural production in developing countries on U.S. consumers. These effects are important both now and in the long run. Very little is known about them although recent experience in world markets for oil seeds suggests that substantial international and intranational redistribution of income can result.

INSTABILITY

Instability of prices of internationally traded agricultural commodities is a major issue that has faced U.S. agricultural policymakers since the early 1970's. This issue will likely continue to be important throughout the next decade. Much of the price instability experienced could not be offset by the release of stocks because U.S. grain stocks, accumulated in prior years as a result of price support programs, were sharply drawn down in 1972 and 1973. The acquisition and release of these Government-held stocks exerted a stabilizing influence on fluctuations in supply and demand, largely for food, in the United States and in world commodity markets as well. This was an unintended consequence of Government policy to support farm incomes by supporting commodity prices above market-clearing levels. The set-aside program, terminated in 1973 for major food and feed products, also served to dampen variations in supply and thus to moderate price variability.

Factors other than reduced U.S. grain stocks have also contributed in a major way to instability in world commodity markets. Agricultural production is always subject to unpredictable variations in weather with consequent destabilizing effects. The decline in world food output in 1972 was due largely to droughts in South Asia, much of Africa, Russia, and elsewhere.

The government policies of other countries have further intensified market instability. Protectionist policies in developed importing countries force the burden of adjustment to higher domestic commodity prices onto exporting countries. The USSR has become an exporter of its own domestic agricultural instability by venturing periodically into U.S. and world markets to purchase supplies of grain rather than restricting consumption in periods of deficit. The U.S.-USSR grain accord has mitigated much of this price instability, but its longrun stabilizing effects in world grain markets are not known. Unexpected sharp increases in world petroleum prices have in the past made the adjustment process difficult by both contributing to increases in prices of agricultural production inputs and sharply reducing the demand for agricultural commodities.

Most of the issues identified here relate to international efforts to achieve greater price stability in world markets. Trade liberalization, in addition to accomplishing U.S. domestic goals related to farm income, consumer prices, and Government expenditures, can contribute to greater stability of supplies and prices. In the absence of trade restrictions, weather-induced fluctuations in supply could be offset by trade flows between surplus and deficit regions. But close linkages between domestic agricultural and trade policies can stand in the way of trade liberalization and force adjustments to instability onto other countries.

Greater regulation of international commodity markets, as proposed by the European Community and Japan in the MTN's or by the Group of 77 in UNCTAD, is also intended to moderate price instability of internationally traded commodities. But major disagreements over the extent to which international commodity markets should be managed preclude, for the moment, successful negotiation of comprehensive schemes for regulating international markets. The economic consequences of managed commodity trade are not well researched and, if managed improperly, such commodity agreements could actually work to destabilize prices by untimely buying and selling of commodities.

The difficulties of managing commodity markets through ICA's are multiple. Among them are: determining the size of stocks needed to affect the market; decision rules governing release and acquisition of stocks; and formulae for cost-sharing in international schemes. In addition to largely administrative difficulties must be added the effects of ICA's on producer incomes, consumer welfare, and government budget expenditure.

Of particular concern has been the problem of instability in world grain markets. Numerous proposals have been made for international agreements on reserve stocks of grain, but negotiations of an international sysem of grain reserves within the International Wheat Council in London have yet to be concluded.

CONCLUSION

The growing interdependence in world agriculture since the early 1970's has created a new set of problems. U.S. agricultural-food policy must involve greater cognizance of the issues of commercial trade, food aid, agricultural development and assistance, and the stability of world commodity markets.

New tradeoffs exist between domestic and foreign producers and consumers, some with immediate implications for farm incomes and food prices, and others with longer run impacts on production, consumption, and trade. There is a growing need for economic analyses that adequately account for the domestic and international con of trade liberalization, international commodity agreements, food aid, and agricultural development assistance.

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